

An Amphibian and Reptile Inventory of Pictured Rocks National Lakeshore

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Painted turtle, Alger Co., Michigan (photo G.S. Casper)

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1. Summary

The National Park Service, Great Lakes Network Office, commissioned a herpetological inventory of Pictured Rocks National Lakeshore in 2004. Pictured Rocks National Lakeshore covers approximately 29,542 hectares along the south shore of Lake Superior in the Upper Peninsula of Michigan, in Alger County (Figure 1). Objectives of the study were to supplement existing inventory data for amphibians and reptiles in the park, and better assess the status of species listed as “Unconfirmed” or “Probably Present” in the species lists produced in 2003 for each Great Lakes Network park. Based on the 2003 list status, and additional review of regional status, 14 species were targeted for surveys (Table 1). Results confirmed the presence of 17 species in the park, and another four species are probably present but remain unconfirmed. Records for 163 museum specimens from Alger County were reviewed, as well as frog and toad survey data, and published and unpublished literature. One-hundred fifty new voucher specimens were collected from the park. The first record for the star-nosed mole from the park was obtained incidental to snake surveys. Recommendations are made regarding monitoring and management of amphibians and reptiles in the park.

2. Methods

Sampling sites in the park and its buffer zone were selected in cooperation with park staff. The investigator and two experienced field assistants (Thomas Anton and David Mauger) conducted sampling over four periods (May 7-16, May 29-June 6, July 21-22, Sept 10-14), with 34 person field days accumulated. Collection and preservation of voucher specimens followed Simmons (2002); voucher specimens were deposited at the Milwaukee Public Museum. Tissue samples (tail, toe and scale clips) from most individuals captured were preserved in 95% ethanol for use in future DNA analyses. Field notes and specimen data are found in appendices A - D.

Visual searches of habitat areas, coupled with listening surveys to locate and identify calling frogs and toads, were used as primary sampling methods throughout the study (Figure 2). Specialized searches for nesting four-toed salamanders (*Hemidactylium scutatum*) concentrated on mossy hummocks in shallow ponds in late May and June. Dip netting was performed occasionally for sampling amphibians in May and June. Aquatic funnel traps (collapsible minnow traps, 25 X 25 X 43 cm with two 5 cm throat openings, steel wire frame and fine brown nylon mesh) were used to sample for amphibians in ponds at nine sites (Figure 2; Table 2). Baited hoop net traps (76 cm diameter, 2.5-3.8 cm square nylon mesh baited with canned sardines) were used to sample for turtles at 5 sites (Figure 2; Table 2). Artificial cover objects (61 by 122 cm pieces of 1.9 cm exterior plywood) were deployed for sampling snakes and lizards in five grassy meadow areas (Figure 3; Table 2). These provide shelter and retain heat at night, attracting reptiles. Pieces of thin black plastic sheeting (approximately 61 by 91 cm), which heat the underlying ground upon sun exposure, were also experimentally placed into an additional six grassy meadow areas using lawn staples (Figure 3; Table 2).

In addition to field work, we also performed a thorough review of available data and documentation of regional herpetofauna. Frog and toad survey data for the park were reviewed, interviews were conducted with park staff (Lora Loope and Jerry Belant) and a local herpetologist (Jeffrey S. Davis), and listings of amphibian and reptile holdings from Alger County were requested from 19 museums (Table 3).

3. Results

Surveys confirmed 17 species of amphibians and reptiles present in the park (see Table 4 for listing and nomenclature): five salamander species, five frog and toad species, three turtle species, and four snake species. Of these, the wood turtle is considered accidental (without breeding populations), and the northern watersnake is considered present but very rare. An additional one salamander species (common mudpuppy), two frog and toad species (mink and northern leopard frogs), and one snake species (northern ring-necked snake) are probably present but remain unconfirmed. Four more frog species (chorus frog, Cope's gray treefrog, American bullfrog, pickerel frog), one snake species (western foxsnake), and one turtle species (Blanding's turtle) are probably absent but may be rare or accidental. Voucher specimens for this study were deposited at the Milwaukee Public Museum (N=150; Appendix C).

Four museums reported holdings of 163 total specimens from Alger County (Appendix D): California Academy of Sciences (CAS, 3 specimens); Carnegie Museum (CM, 6 specimens); Michigan State University Museum (MSUM, 30 specimens); and University of Michigan Museum of Zoology (UMMZ, 124 specimens). Relevant specimen data are included in the species accounts below.

The frog and toad survey data include two routes in the park (Michigan Frog and Toad Survey routes 381 and 400). Annual survey data from 1996 through 2003 were provided by Lora Loope. Route 381 is on the western side of the park and includes stops at Sand Point, Becker Field, the maintenance complex, Miners Castle Road, Miner's River, and Miner's Beach. Route 400 is on the far eastern edge of the park along M-77. Relevant species data are included in the species accounts below.

A number of unpublished mitigation studies and reports were also provided by Jeffrey S. Davis (Marquette, MI), a local ecologist. Those that contained relevant species data are mentioned in the species accounts below. The most substantial previous sampling effort was conducted in 1990 for environmental assessment of the proposed Beaver Rim Road (Premo and Davis 1990). That study sampled a southwest to northeast transect divided into 6 "zones", A-F (southwest to northeast respectively), each approximately 2 miles long. Zone A began near Legion Lake (T48N, R16W, Section 30), and Zone F ended near Sullivan's Landing (T49N, R15W, Section 10).

3.1 Species Inventory Results (taxonomy follows Crother 2000)

3.1.1 Salamanders

Blue-spotted Salamander (*Ambystoma laterale*):

Blue-spotted salamanders were well distributed throughout the park, and were confirmed in four areas (Figure 4; PR5, PR17, PR82, PR94, PR106). Werner and Davis (1989) also found this species in the Sand Point pond area. Premo and Davis (1990) reported blue-spotted salamanders from their sampling zones A, B, C, and F. Museum holdings included eight Alger County specimens (3 at MSUM, 5 at UMMZ), with two localities near the park: “Adams Trail Road -Silver Lake” and “T48N, R13W, Section 21”.



Blue-spotted salamander, Alger Co., Michigan (photo G.S. Casper)

Spotted Salamander (*Ambystoma maculatum*):

Spotted salamanders were only found in two widely separated areas in the park (Figure 5; PR5, PR72). However, Premo and Davis (1990) reported spotted salamanders from their sampling zones A, C, and F, which fills the gap between the sites confirmed in this study. Museum holdings included two Alger County specimens (UMMZ), with two localities near the park: “T46N, R17W, Section 19 SE 1/4 of SE 1/4” and “Cusino Station, T46N, R17W, Section 30”.



Spotted salamander, Alger Co., Michigan (photo G.S. Casper)

Eastern Tiger Salamander (*Ambystoma tigrinum*):

Tiger salamanders were not detected. The only available records for Alger County are neotenic specimens thought to be escaped from bait operations (Jim Harding, personal communication, 2004). No museum records were found for Alger County.

Eastern Newt (*Notophthalmus viridescens*):

Newts are well distributed throughout the park, and were confirmed from eight areas (Figure 6; PR2, PR5, PR59, PR68, PR72, PR103, PR107, PR111, TA6, TA7). Werner and Davis (1989) also found this species in all four Sand Point ponds. Premo and Davis (1990) reported newts from their sampling zones A, B, C, and F. Lora Loope (Pictured Rocks National Lakeshore) and Lee Newman (fishery biologist, U.S. Fish and Wildlife Service, Ashland, WI)

trapped one specimen in Little Chapel Lake in September, 2004 (Lora Loope, personal communication, 28 September 2004). Museum holdings included thirteen Alger County specimens (2 at MSUM, 11 at UMMZ), with three localities near the park: “Silver Lake, 0.5 mi. NW of Long Lake”, “Grand Island Duck Lake” and “T48N, R13W, Section 21” (also possibly “Merwin Lake” which could not be located on available maps).

Four-toed Salamander (*Hemidactylium scutatum*):

Four-toed salamanders were found in three widely dispersed areas in the park; east, west, and center (Figure 7; PR5, PR75, PR79). They are also known from Grand Island (Davis, 1995). Premo and Davis (1990) encountered only one four-toed salamander in their survey Zone F. Museum holdings included only three Alger County specimens (UMMZ), all well west of the park (i.e., Howes Lake).

Eastern Red-backed Salamander (*Plethodon cinereus*):

Eastern red-backed salamanders are well distributed throughout the park, and were documented in 18 areas (Figure 8; DM2, PR5, PR17, PR23, PR46, PR57, PR59, PR60, PR63, PR66, PR67, PR76, PR77, PR87, PR88, PR93, PR95, PR97, PR107, PR113, PR116, PR121, PR125, PR127, TA3, TA5, TA6, TA7, TA9). Werner and Davis (1989) also found this species in moist logs in wooded areas of Sand Point. Premo and Davis (1990) found red-backed salamanders along all their transects (A-F). Museum holdings included eleven Alger County specimens (UMMZ), with three localities near the park: “1 mi W Shingleton, T46N, R18W, S25”, “T48N, R13W, Section 21” and “T46N, R18W, SE1/4 NE1/4 Section 27”.

Common Mudpuppy (*Necturus maculosus maculosus*):

Very little appropriate, accessible, habitat for mudpuppies was found, and therefore very limited sampling targeting this species was conducted. One night survey of rip-rap along the north shore of Grand Sable Lake, and one search of the Hurricane River near the H-58 crossing, yielded negative results. The proprietor at the Bear Claw Restaurant reports seeing *Necturus*



Eastern newt (eft stage), Alger Co., Michigan (photo G.S. Casper)



Four-toed salamander, Alger Co., Michigan (photo G.S. Casper)

maculosus while snorkeling as a kid in Munising Bay of Lake Superior, near the hospital, in a sandy bottom area. He also said they are in Pete's Lake on Hwy 13 south of Munising, and west of Munising in Lake Superior off the road to Pete's Bar, under flat rocks. Museum holdings included eight Alger County specimens (UMMZ), with one locality near the park: "Au Train Lake".

3.1.2 Frog and Toads

Eastern American Toad (*Bufo americanus americanus*):

Toads are well distributed throughout the park, and were documented in nine areas (Figure 9; PR2, PR11, PR15, PR16, PR19, PR25, PR66, PR70, PR72, PR86, PR97, PR102, PR115, TA4, TA6). Werner and Davis (1989) found this species throughout the Sand Point area. Premo and Davis (1990) found toads in all of their sampling zones (A-F). Frog and Toad Survey data recorded toads from Route 381 (stops 1, 2, 5, and 10) and Route 400 (all stops). Museum holdings included eleven Alger County specimens (3 at MSUM, 8 at UMMZ), with the one locality near the park given only as "Munising".



American toad, Wisconsin (photo G.S. Casper)

Boreal or Western Chorus Frogs (*Pseudacris maculata*, *P. triseriata*):

Chorus frogs were not detected despite appropriate survey effort. Frog and Toad Survey data reported the chorus frog in 1998 and 2001 from stop 3 on Route 381 at Sand Point. However, the observer (Lora Loope) has reservations on the accuracy of this record. Jeff Davis believes these species are absent from Upper Michigan, and concurs with this investigator that observers sometimes mistake the trill call of the northern spring peeper for chorus frogs (personal communication, 2004). No museum records were found for Alger County.



Spring peeper, Alger Co., Michigan (photo G.S. Casper)

Northern Spring Peeper (*Pseudacris crucifer crucifer*):

Northern spring peepers are well distributed throughout the park, and were confirmed from 24 areas (Figure 10; DM2, PR2, PR3, PR5, PR6, PR7, PR9, PR10, PR11, PR12, PR13,

PR15, PR16, PR17, PR23, PR29, PR30, PR50, PR61, PR64, PR65, PR69, PR71, PR72, PR73, PR86, PR98, PR100, PR102, PR104, PR105, PR124, TA2, TA6, TA9). Werner and Davis (1989) considered this species common in the Sand Point area. Premo and Davis (1990) reported them from their sampling zones A, B, C, D, and F. Frog and Toad Survey data recorded peepers from all stops on routes 381 and 400. Museum holdings included two Alger County specimens (UMMZ), with no localities near the park.

Gray Treefrog (*Hyla versicolor*):

Gray treefrogs are well distributed throughout the park, and were confirmed from ten areas (Figure 11; PR8, PR11, PR54, PR69, PR71, PR72, PR80, PR86, PR98, PR99, PR102, PR124, TA4, TA6, TA9). Werner and Davis (1989) reported gray treefrogs from the Sand Point area. Premo and Davis (1990) reported them from their sampling zones A, B, C, and F. Frog and Toad Survey data recorded gray treefrogs from Route 381 (stops 2, 3, and 5) and Route 400 (stops 4, 8, 9, and 10). Museum holdings included three Alger County specimens (2 at MSUM, 1 at UMMZ), with one locality near the park: "T47N, R16W, Section 29".



Gray treefrog, Alger Co., Michigan (photo G.S. Casper)

Cope's Gray Treefrog (*Hyla chrysoscelis*):

No Cope's gray treefrogs were detected, and Jeff Davis considers them absent from the Upper Peninsula (personal communication, 2004). No Cope's gray treefrogs have been recorded from the Frog and Toad Survey routes. No museum records were found for Alger County.



Northern green frog, Alger Co., Michigan (photo G.S. Casper)

American Bullfrog (*Rana catesbeiana*):

No bullfrogs were detected. Jeff Davis feels bullfrogs are introduced in the region (personal communication, 2004). Frog and Toad Survey data recorded bullfrogs only from 2000 and 2003 on Route 400 (stops 1, 3, 4, and 5). No museum records were found for Alger County.

Northern Green Frog (*Rana clamitans melanota*):

Northern green frog are well distributed throughout the park, and were confirmed from 15 areas (Figure 12; DM2, PR1, PR2, PR5, PR8, PR16, PR23, PR37, PR56, PR68, PR70, PR73,

PR86, PR89, PR93, PR96, PR105, PR121, PR126, PR128, TA2, TA4, TA6, TA9, TA_POND). Werner and Davis (1989) considered this species common in the Sand Point area. Premo and Davis (1990) reported northern green frogs from their sampling zones A and F. Frog and Toad Survey data recorded northern green frogs from Route 381 (stops 2, 3, 6, and 10) and Route 400 (all stops). Museum holdings included thirteen Alger County specimens (2 at MSUM, 11 at UMMZ), with two localities near the park: “Munising” and “near Shingleton Section 29 30 31 and 32, T45N, R17W”.

Pickerel Frog (*Rana palustris*):

No pickerel frogs were detected in this study. Jeff Davis considers pickerel frogs to be absent from the Upper Peninsula (personal communication, 2004). No pickerel frogs have been recorded from the Frog and Toad Survey routes. No museum records were found for Alger County.

Northern Leopard Frog (*Rana pipiens*):

No northern leopard frogs were detected in this study. Jeff Davis considers them to be very local in the southern Upper Peninsula (personal communication, 2004), but he found them in the Shingleton Bog Wilderness south of Shingleton (Davis 1989b), and in the Big Island Lake Wilderness Area south of Shingleton (Davis 1992). Jerry Belant observed them along the shore of Miner’s River at the park bridge about 2001. Premo and Davis (1990) reported northern leopard frogs from their sampling zones A and F. Frog and Toad Survey data recorded northern leopard frogs from Route 381 (only stop 10) and Route 400 (stops 1, 4, 6, and 8). Museum holdings included ten Alger County specimens (3 at MSUM, 7 at UMMZ), with two localities near the park: “T47N, R16W, Section 29”, and “near Shingleton Sec 29 30 31 and 32, T45N, R17W” (also possibly “Gladwin Lake” which could not be located on available maps).

Mink Frog (*Rana septentrionalis*):

No mink frogs were detected in this study. However, Werner and Davis (1989) reported a few mink frogs from one Sand Point pond. Premo and Davis (1990) found mink frogs in their sampling zones A, B, C, D, and F. Jeff Davis has also found mink frogs in the Shingleton Bog Wilderness Area south of Shingleton (Davis 1989b), in the Big Island Lake Wilderness Area south of Shingleton (Davis 1992), on Grand Island (Davis, 1995), and in the Rock River Wilderness Area west of Munising (Davis 1989a). Frog and Toad Survey data recorded mink frogs only in one year (2003) on Route 400 (stops 3, 5, 6, 9). Museum holdings included 33 Alger County specimens (3 at CAS, 3 at CM, 4 at MSUM, 23 at UMMZ), all from localities well west of the park (i.e., “Sand River”, “Whitefish Lake”, “Onota Twp”).

Wood Frog (*Rana sylvatica*):

Wood frogs are well distributed throughout the park, and were confirmed from 14 areas (Figure 13; DM2, PR3, PR5, PR6, PR13, PR17, PR23, PR50, PR54, PR66, PR68, PR71, PR72, PR86, PR97, PR111, TA2). Werner and Davis (1989) encountered this species frequently in the Sand Point area. Premo and Davis (1990) found wood frogs in their sampling zones A, B, C, D,

and F. Frog and Toad Survey data recorded wood frogs from Route 381 (stop 6 only) and Route 400 (all stops). Museum holdings included 18 Alger County specimens (8 at MSUM, 10 at UMMZ), including four localities near the park: “Silver Lake, 0.5 mi. NW of Long Lake”, “T47N, R16W, Section 29”, “near Shingleton Sec 29 30 31 and 32, T45N, R17W”, and “Alger Falls 1 mi S of Munising”.



Wood frog, Alger Co., Michigan (photo G.S. Casper)

3.1.3 Turtles

Eastern Snapping Turtle (*Chelydra serpentina serpentina*):

Eastern snapping turtles were detected in three areas: Sand Point, Twelve Mile campground ponds, and Section 16 Lake (Figure 14; PR68, PR69, PR104). Werner and Davis (1989) reported encountering this species in the Sand Point area, and a couple walking the Sand Point trail said they see snapping turtles there regularly. Premo and Davis (1990) reported snapping turtles from their sampling zones A and F. No museum records were found for Alger County.



Snapping turtle, Alger Co., Michigan (photo G.S. Casper)

Wood Turtle (*Glyptemys (Clemmys) insculpta*):

No wood turtles were detected in the park in this study. Only one specimen (MPM 33960) is known from the park, collected by Jeff Davis in 1990, and found dead in the woods near the Twelve Mile Beach Campground (also mentioned in Premo and Davis 1990). No other museum records were found for Alger County. Jeff Davis considers them common south of the park, such as in the Stutz and Indian Rivers (personal communication, 2004; Davis, 2003).

Blanding’s Turtle (*Emydoidea blandingii*):

No Blanding’s turtles were detected in the park in this study. Jeff Davis reports them on M95 south of Hwy 41, and also in Seney, but believes they probably are not found in the Lake Superior watershed (personal communication, 2004). No museum records were found for Alger County.

Painted Turtle (*Chrysemys picta*):

Painted turtles were detected in nine areas (Figure 15; PR2, PR7, PR8, PR54, PR68, PR69, PR70, PR72, PR86, PR93, PR105, PR123, TA4, TA6, TA9). Werner and Davis (1989) considered this species common in their Sand Point surveys, and a couple walking the trail said they see painted turtles there regularly. Premo and Davis (1990) reported painted turtles from their sampling zones A and F. A park ranger reported them nesting on Grand Sable Dunes near the lake (personal communication, 2004). Lora Loope (Pictured Rocks National Lakeshore) and Lee Newman (fishery biologist, U.S. Fish and Wildlife Service, Ashland, WI) trapped one specimen in Little Chapel Lake in September, 2004 (Lora Loope, personal communication, 28 September 2004). Museum holdings included only one Alger County specimen (UMMZ) with no other locality data.

3.1.4 Lizards

Common Five-lined Skink (*Eumeces fasciatus*):

No skinks were detected in this study. Jeff Davis reports them from dry plains in the Shingleton Bog Wilderness south of Shingleton (Davis 1989b). No museum records were found for Alger County.

3.1.5 Snakes

Northern Ring-necked Snake (*Diadophis punctatus edwardsii*):

No northern ring-necked snakes were found in this study. However, Jeff Davis considers them rare or hard to find, and has observed them on Grand Island, in the Big Island Lake Wilderness Area south of Shingleton (Davis 1992), in the Shingleton Bog Wilderness south of Shingleton (Davis 1989b), and in pine stumps in the Kingston Plains area (personal communication, 2004). No museum records were found for Alger County.



Northern ring-necked snake, Wisconsin
(photo G.S. Casper)



Smooth greensnake, Alger Co., Michigan
(photo G.S. Casper)

Smooth Greensnake (*Opheodrys vernalis*):

Smooth greensnakes were found throughout the park and confirmed in eight areas (Figure 16; PR92, PR103, PR111, PR113, PR114, PR118, PR120, TA4, TA5). Jeff Davis also found greensnakes commonly laying eggs in the Kingston Plains in June (personal communication, 2004). Premo and Davis (1990) reported greensnakes from their sampling zones A, D, E, and F. Jerry Belant reports greensnakes near the northwest corner of the white barn at the Grand Sable

Visitor Center (PR25), and a couple walking the trail at Sand Point said they have seen greensnakes on boardwalk. Museum holdings included two Alger County specimens (UMMZ), with one locality near the park: “Shingleton”.

Western Foxsnake (*Elaphe vulpina*):

No foxsnakes were detected in this study. Jeff Davis reported foxsnakes only well inland from Lake Superior in the Upper Peninsula (personal communication, 2004), including a road killed specimen encountered on FS2254 approximately 15 miles south of Shingleton in the Big Island Lake Wilderness Area (Davis 1994). Museum holdings included two Alger County specimens (UMMZ), from one locality near the park: “Cusino Station, T46N, R17W, Section 30”.

Eastern Milksnake (*Lampropeltis triangulum triangulum*):

No milksnakes were found in this study. Jeff Davis reports milksnakes from the Harlow Lake railroad grade northwest of Marquette, from Seney, and from the Huron Mountain Club near Ives Lake, but considers them very rare and associated with rock outcrops (personal communication, 2004). No museum records were found for Alger County.

Eastern Gartersnake (*Thamnophis sirtalis sirtalis*):

Eastern gartersnakes were found throughout the park and confirmed in eleven areas (Figure 17; PR2, PR8, PR11, PR32, PR59, PR67, PR68, PR70, PR74, PR80, PR96, PR109, PR111, PR115, PR117, TA6). Werner and Davis (1989) did not encounter this species in their Sand Point surveys but considered it likely to be present. Premo and Davis (1990) found gartersnakes in all of their sampling zones (A-F). Museum holdings included 12 Alger County specimens (1 at MSUM, 11 at UMMZ), including two localities near the park: “Wilderspin’s, T47N, R16W, Sec 29” and “Alger Falls 1 mi S of Munising”.

DeKay’s Brownsnake (*Storeria dekayi*):

No brownsnakes were detected in this study. No museum records were found for Alger County.

Northern Red-bellied Snake (*Storeria occipitomaculata occipitomaculata*):

Northern red-bellied snakes were found throughout the park and confirmed in seven areas (Figure 18; PR19, PR25, PR42, PR48, PR96, PR105, PR108, PR110, PR114, PR126). Werner and Davis (1989) did not encounter this species in their Sand Point surveys but considered it likely to be present. Premo and Davis (1990) found red-bellied snakes in all of their sampling



Northern red-bellied snakes mating, Alger Co., Michigan (photo G.S. Casper)

zones (A-F). Museum holdings included nine Alger County specimens (3 at CM, 2 at MSUM, 4 at UMMZ), including two localities near the park: “2 mi E of Munising” and “near Shingleton Sec 29 30 31 and 32, T45N, R17W”.

Northern Watersnake (*Nerodia sipedon sipedon*):

No northern watersnakes were found in this study, but Jeff Davis supplied a road killed specimen collected from H-58 at the Hurricane River (MPM 33959), considers them present in some of the Kingston Plains lakes (personal communication, 2004), and also found them near Big Island and Townline Lakes in the Big Island Lake Wilderness Area south of Shingleton (Davis 1992). Premo and Davis (1990) found one watersnake in Sullivan Creek (corner of sections 9, 10, 15, 16, T49N, R15W) in their sampling Zone F. Museum holdings included two Alger County specimens (UMMZ), both well south of the park.

3.1.6 Other Fauna

The following birds were observed: common raven, American crow, blue jay, sandhill crane, great blue heron, green heron, Cooper's hawk, turkey vulture, bald eagle, peregrine falcon, northern harrier, bald eagle, broad-winged hawk, red-tailed hawk, merlin, barred owl, pileated woodpecker, yellow-shafted flicker, downy woodpecker, yellow-bellied sapsucker, hairy woodpecker, white-throated sparrow, savanna sparrow, white-crowned sparrow, chipping sparrow, song sparrow, swamp sparrow, American robin, wood thrush, gray catbird, veery, wood peewee, eastern kingbird, great-crested flycatcher, ring-billed gull, common merganser, mallard, red-breasted merganser, common loon, blue-winged teal, wood duck, red-winged blackbird, common grackle, rusty blackbird, bobolink, ruffed grouse, yellowlegs, ruby-crowned kinglet, yellow-rumped warbler, chestnut-sided warbler, palm warbler, black and white warbler, solitary vireo, Nashville warbler, American yellowthroat, ovenbird, red-eyed vireo, belted kingfisher, cedar waxwing, chimney swift, European starling, rose-breasted grosbeak, tree swallow, American goldfinch, red-breasted nuthatch, black-capped chickadee.

The following mammals were observed (or sign thereof): racoon, gray squirrel, red squirrel, eastern chipmunk, white-tailed deer, snowshoe hare, marten, hoary bat, unidentified bats, American beaver, meadow jumping mouse, white-footed mouse, porcupine, black bear. In addition, one star-nosed mole (*Condylura cristata*), the first park record for this species, was collected from underneath a snake sampling board at the Grand Sable beaver pond (PR2) on 10 Sept 2004. This specimen was deposited at the University of Michigan Museum of Zoology, Ann Arbor, Michigan (catalog no. 176356).

The following fishes were observed: Grand Sable beaver pond (PR2) - *Catostomus catostomus*, *Ambloplites rupestris*, and *Cottus bairdii*. Section 16 Lake (PR68) - darters (*Etheostoma exile?*), stickelbacks (*Gasterosteus aculeatus*), bluntnose minnows (*Pimephales promelas*).

Earthworms were noted throughout the park, including nightcrawlers. A giant water beetle was trapped at the Grand Sable beaver pond (PR2). Fairy shrimp were observed in the pond at PR1. The Lowney Creek impoundment (PR96) has many mussels. Leeches were observed in Section 16 Lake (PR68).

4. Species Inventory Discussion

Table 4 provides an updated species list for the park, with additional notes below.

4.1 Salamanders

Blue-spotted Salamander (*Ambystoma laterale*):

This and previous studies confirm that blue-spotted salamanders are found throughout the park in appropriate forested habitat. Their abundance is expected to be positively associated with ephemeral wetlands, increasing canopy closure, amount of downed woody debris, thickness of duff, hardwoods, and loamy soils; and negatively associated with acid soils and dry soils. They can be detected and monitored by visual surveys for eggs and adults, and aquatic trapping of larvae and adults. Good habitat for this species can be found throughout the park in older hardwood stands, such as in the Chapel Lake area, so long as breeding ponds are available.

Spotted Salamander (*Ambystoma maculatum*):

This and previous studies confirm that spotted salamanders are widely dispersed through the park in appropriate forested habitat. Like blue-spotted salamanders, their abundance is expected to be positively associated with ephemeral wetlands, increasing canopy closure, amount of downed woody debris, thickness of duff, hardwoods, and loamy soils; and negatively associated with acid soils and dry soils. They can be detected and monitored by visual surveys for eggs and adults, and aquatic trapping of larvae and adults. This species is more fossorial than the blue-spotted salamander, however, and consequently harder to detect except during the spring breeding period when adults are on the surface and easily trapped in breeding ponds. Their distribution may be fairly localized to older hardwood stands around breeding ponds. The Hurricane River pond had an especially good population (PR5), but many less accessible ponds farther west in the park probably also harbor excellent populations.

Eastern Tiger Salamander (*Ambystoma tigrinum*):

There is no evidence that tiger salamanders are present in the park. Their presence in the Upper Peninsula appears to be human assisted and limited to one site, where they may already be extirpated.

Eastern Newt (*Notophthalmus viridescens*):

This and previous studies confirm that newts are found throughout the park and surrounding region. Most specimens examined had red dorsolateral spots bordered with black (sometimes asymmetrically with spots on one side only), but some lacked red spots altogether.

This character state fits neither typical subspecific description, neither the more eastern occurring red-spotted newt (*Notophthalmus viridescens viridescens*) nor the more western occurring central newt (*Notophthalmus viridescens louisianensis*) (Harding 1997). It is possible that newt populations in the park represent a post-glacial, secondary contact zone, for these two subspecies. Newts prefer permanent but well-vegetated ponds, and can tolerate drier terrestrial habitats than other salamanders, and therefore are present throughout the park including the drier Kingston Plains. They are best detected and monitored by aquatic trapping of larvae and adults.

Four-toed Salamander (*Hemidactylium scutatum*):

This and previous studies confirm that four-toed salamanders are present in the park and surrounding region. However, they seem to be uncommon and probably have a patchy distribution, centered on appropriate breeding ponds in moist forest. Four-toed salamanders prefer moist, mature forests which include wetlands meeting their specialized breeding requirements. Eggs are laid in moss hummocks (although other moist vegetable matter is sometimes used) over shallow, stagnant waters; conditions often found in shaded vernal pools with mossy downed woody debris (PR5), and alder thickets with moss mounds (PR75). Like blue-spotted salamanders, their abundance is expected to be positively associated with ephemeral wetlands, increasing canopy closure, amount of downed woody debris, thickness of duff, hardwoods, and loamy soils; and negatively associated with acid soils and dry soils. They are best detected and monitored by searching for nests and adults at breeding ponds in late May and early June.

Eastern Red-backed Salamander (*Plethodon cinereus*):

This species is very common in the park and surrounding region. They are wholly terrestrial, preferring moist, mature forests with abundant downed woody debris, in which they nest. They are highly territorial, and abundance is expected to be positively associated with increasing canopy closure, amount of downed woody debris, thickness of duff, hardwoods, and loamy soils; and negatively associated with acid soils and dry soils. It was somewhat surprising to find red-backed salamanders common even on the Kingston Plains, given the fairly open canopy and sand soils, but this ecosystem is unusual in having a high water table, having been previously forested before logging began, and now having many rotting stumps in which these salamanders live. They are best detected and monitored by searching for adults by time and/or area constrained sampling in May and June, or October.

Common Mudpuppy (*Necturus maculosus maculosus*):

No records exist for mudpuppies in the park, and no habitat conducive to long-term sampling was found in this study (permanent waters with structured bottoms, such as rock or woody debris, providing shelter and nesting sites). This species is, however, present regionally, including in Lake Superior and apparently in some regional lakes. It therefore could utilize portions of the park lakeshore where fractured bedrock, or submerged log piles, provide appropriate shelter. Its status remains uncertain, but it is unlikely that manageable populations occur within the park.

4.2 Frogs and Toads

Eastern American Toad (*Bufo americanus americanus*):

This species is very common in the park and surrounding region, in virtually all habitats. They are most abundant around good breeding sites such as weedy lake margins, marshes, and permanent and semi-permanent ponds. They are best detected and monitored by calling surveys.

Boreal or Western Chorus Frogs (*Pseudacris maculata*, *P. triseriata*):

Chorus frogs appear to be either absent or extremely rare in the park. This study, and ongoing Frog and Toad Calling Surveys, should have detected them if present. Sunny, open wetland habitat in the Sand Point area appears to be appropriate for them, but the few reports from this area have not been confirmed. Where chorus frogs are present they are usually easily detected by calling surveys, and rarely have less than 10 individuals calling in a chorus. Many people not familiar with chorus frogs mistake the trill call of the northern spring peeper for a chorus frog. These are generally lone calls rather than a sustained chorus, and shorter in duration. Until confirmation is obtained this species should be considered absent from the park. Ongoing Frog and Toad Calling Surveys are sufficient to detect and monitor them.

Northern Spring Peeper (*Pseudacris crucifer crucifer*):

Northern spring peepers are very common in the park and surrounding region, in virtually all habitats. They are most abundant in forested habitats around good breeding sites (ephemeral wetlands), and are best detected and monitored by calling surveys.

Gray Treefrog (*Hyla versicolor*):

Gray treefrogs are common in the park and surrounding region in forested habitats. They are most abundant in forested habitats around good breeding sites (ephemeral wetlands and shallow marsh), and are best detected and monitored by calling surveys.

Cope's Gray Treefrog (*Hyla chrysoscelis*):

Cope's gray treefrogs appear to be either absent or extremely rare in the park. This study, and ongoing Frog and Toad Calling Surveys, should have detected them if present. The most likely areas for their occurrence would be the barrens habitats in the Kingston Plains or Sand Point areas. Ongoing Frog and Toad Calling Surveys are sufficient to detect and monitor this species.

American Bullfrog (*Rana catesbeiana*):

American bullfrogs appear to be absent from the park, and Harding (1997) considers them absent from the Lake Superior basin. Stops on Frog and Toad Survey Route 400 where bullfrogs were recorded in 2000 and 2003 are not actually in the park, and these records need confirmation with voucher specimens. Ongoing Frog and Toad Calling Surveys are sufficient to detect this species should it spread into park boundaries. It is considered an invasive species in western North America and many foreign countries, and can displace other native ranid frogs. It

requires permanent waters for its two year larval development cycle, and many lagoons and lakes within the park boundaries could support this species.

Northern Green Frog (*Rana clamitans melanota*):

Northern green frogs are very common in the park and surrounding region along shorelines of lakes and streams, and in wetlands. They are most abundant in warm water habitats with abundant vegetative cover, and are best detected and monitored by calling surveys.

Pickerel Frog (*Rana palustris*):

Pickerel frogs appear to be absent from the park, but detection is difficult, and their presence cannot be ruled out. Ongoing Frog and Toad Calling Surveys are generally not sufficient to detect this species with confidence (false negatives are common). It has a weak call and a brief calling period. Pickerel frogs prefer streams, and may be absent from the Lake Superior basin.

Northern Leopard Frog (*Rana pipiens*):

Northern leopard frog status in the park remains problematic. There are reports from the Miner's River area (J. Belant observations), and from several areas not far outside park boundaries (Frog Route 400, near Shingleton). This study did not confirm their presence, but effort was not sufficient to rule out false negatives. Ongoing Frog and Toad Calling Surveys have poor reliability in detecting this species, which has a weak call and a brief calling period. Combining calling surveys with visual searches of breeding habitat in May is recommended. Open, sunny, wetlands are optimal habitats, such as the Sand Point area, and many wetlands in the Kingston Plains. They are often patchily distributed and only locally abundant in the Great Lakes (Harding 1997).

Mink Frog (*Rana septentrionalis*):

Mink frog status in the park is problematic. While reported from several locations, no voucher specimens are available for confirmation, and none were found in this study despite searches of appropriate habitat. Confusion with the northern green frog is common, and possible mimicry and/or hybridization is suspected between these species (Harding 1997). Reports from Frog and Toad Survey Route 400 should be confirmed with vouchers, although these are not within park boundaries. While this study did not confirm mink frog presence, neither was effort sufficient to rule out their presence. Mink frogs sometimes call late at night (midnight to 4 AM where sympatric with northern green frogs in the Keweenaw Peninsula, personal observation), and can therefore be missed on calling surveys. Ongoing Frog and Toad Calling Surveys thus have only fair reliability in detecting this species unless additional listening periods are added after midnight. Combining calling surveys with visual searches of breeding habitat is recommended. Open, sunny, vegetative mats and shorelines of permanent waters are optimal habitats, such as the Sand Point area, and beaver ponds in the Beaver Basin. Mink frogs primarily inhabit the aquatic zone, sitting on lily pads or other floating vegetation. Alger County museum specimens should also be verified.

Wood Frog (*Rana sylvatica*):

Wood frogs are common throughout the park in forested habitat. Their abundance is expected to be positively associated with ephemeral wetlands, increasing canopy closure, thickness of duff, hardwoods, and loamy soils; and negatively associated with acid soils and dry soils. They can be detected and monitored by visual surveys for eggs and adults at breeding ponds, and by calling surveys. Good habitat for this species can be found throughout the park where breeding ponds are available, although they are probably less common or absent from drier portions of the Kingston Plains.

4.3 Turtles

Eastern Snapping Turtle (*Chelydra serpentina serpentina*):

Eastern snapping turtles are confirmed from several lakes and ponds within the park, and probably occupy most permanent lakes and deep ponds within the park, as well as larger streams. They prefer warm waters with abundant aquatic vegetation. They are easily detected and monitored by trapping.

Wood Turtle (*Glyptemys (Clemmys) insculpta*):

The one wood turtle record for the park may be representative of occasional individuals wandering north from established populations to the south (Seney Wilderness Area). This study examined portions of all major streams for wood turtle habitat and found only fair quality habitat on two streams: the Hurricane River (best area sections 23, 25 and 26 of T49N, R15W), and Miner's River (sections 3 and 10, T47N, R18W). It is doubtful that either site could sustain a breeding population without recurrent immigration. Periodic monitoring of potential nesting sites (sandy eroded banks with south to southwest exposure) in mid-June would confirm population presence or absence.

Blanding's Turtle (*Emydoidea blandingii*):

Blanding's turtles are probably present to the south (Seney Wilderness Area) but not within the park. Trapping of appropriate shallow marsh and bog habitats produced no Blanding's turtles in this study. They may occasionally turn up as accidental wanderers, but it is unlikely that breeding populations occur within the park.

Painted Turtle (*Chrysemys picta*):

Painted turtles are confirmed from many waters and wetlands within the park, and probably occupy most permanent lakes and deep ponds within the park, as well as larger streams and wetlands. They are the most abundant turtle within the park and are easily detected and monitored by trapping and basking surveys. They prefer warm waters with abundant aquatic vegetation.

4.4 Lizards

Common Five-lined Skink (*Eumeces fasciatus*):

Five-lined skinks are apparently absent from the park and surrounding regions. The closest reports are from the Shingleton Bog Wilderness (Davis 1989b). Harding (1997) notes that this species distribution is very discontinuous and colonial in the north.

4.5 Snakes

Northern Ring-necked Snake (*Diadophis punctatus edwardsii*):

While no northern ring-necked snakes were found in this study they are hard to detect and may be present nevertheless. While ring-necked snakes could be present in low numbers almost anywhere within the park, and spend much of their life cycle within forests (where they prey mainly on eastern red-backed salamanders), they are most often detected by searching for gravid females in sunny, grassy, fields adjacent to forests in May and June. A promising area is the pine stump fields of the Kingston Plains. A program of snake surveys would eventually detect them if present, by the same methods as utilized for smooth greensnakes and eastern gartersnakes.

Smooth Greensnake (*Opheodrys vernalis*):

Smooth greensnakes are common throughout the park in open, sunny habitats, especially in sandy soils such as the Kingston Plains and the Chapel Beach sandscape. They are common in grassy meadows left over from past farming, ranching, and homesteading as well. At Sand Point they have not been confirmed, but habitat is good and additional sampling is warranted. They can be detected and monitored with cover object surveys.

Western Foxsnake (*Elaphe vulpina*):

Western foxsnakes are probably absent from the park, although they are not easily detected and could be present in low numbers. The park is near the northeastern range limit for this species. A program of snake surveys would eventually detect them if present, by the same methods as utilized for smooth greensnakes and eastern gartersnakes.

Eastern Milksnake (*Lampropeltis triangulum triangulum*):

Eastern milksnakes are probably absent from the park. A colony west of Marquette is disjunct from the main range to the south, and Upper Peninsula records are otherwise limited to a very few along the northeastern shore of Lake Michigan.

Eastern Gartersnake (*Thamnophis sirtalis sirtalis*):

Eastern gartersnakes are the most common snake in the park, and found throughout the park, especially near wetlands that support ranid frogs, a favorite food. They are commonly encountered in grassy meadows throughout the park, and can be detected and monitored with cover object surveys.

DeKay's Brownsnake (*Storeria dekayi*):

DeKay's Brownsnake are almost certainly absent from the park. The very few records from the Upper Peninsula are well removed from the park.

Northern Red-bellied Snake (*Storeria occipitomaculata occipitomaculata*):

Northern red-bellied snakes are very common throughout the park, especially in grassy meadows. They can be detected and monitored with cover object surveys.

Northern Watersnake (*Nerodia sipedon sipedon*):

Northern watersnakes appear to be present but very rare in the Hurricane River and Sullivan Creek areas, and possibly in other lakes and streams as well. They warrant additional surveys but do not respond well to cover objects, and shoreline visual searches should be used instead.

5. Recommendations

5.1 Conservation and Management

Generally, existing park policy of maintaining and restoring natural plant communities is beneficial to resident amphibians and reptiles. Some forest tracts are deficient in downed woody debris as a result of past logging activities, which is probably suppressing forest amphibian abundance, but downed woody debris will build up again in time. Sunny openings are important to snakes for thermoregulation, as well as for the foraging and cover opportunities provided by ground vegetation, especially grasses. Smooth greensnakes are especially dependant upon these meadows, where they hunt insects, as are pregnant females of all species, which seek warm environments for embryo development. Many of these openings are natural (sandscapes at Sand Point and Chapel Beach), and others are the result of past clearings for homesteads. Management to maintain these communities will benefit snakes. Control of woody vegetative growth that might result from fire suppression, including control of woody invasive species, is recommended to maintain these open meadows.

Wetlands are important to many amphibians and reptiles, and existing park policy for maintaining natural wetland, lake, and stream communities, and addressing pollution and invasive species problems, will benefit wetland and aquatic amphibians and reptiles. Many frogs and salamanders are dependant upon ephemeral wetlands (vernal pools, sedge meadows), and other shallow wetlands lacking fishes (freeze out ponds), for successful reproduction. Stocking fishes in isolated ponds is detrimental to these species. Maintenance of natural, undeveloped, shoreline is beneficial to many turtles and ranid frogs, and high quality aquatic macrophyte beds are important to these species as well as newts.

Impoundments, both natural (beaver ponds) and artificial (dams such as on Lowney Creek), create pond communities that often provide excellent habitat for aquatic turtles (painted

and snapping turtles), ranid frogs (American bullfrog, northern green frog, northern leopard frog, mink frog), newts, and northern watersnakes; as well as eastern gartersnakes which frequent these shorelines preying on ranid frogs. These species probably fluctuate in distribution and abundance depending upon the availability of these somewhat transient (beaver ponds) communities. The importance of both natural and artificial impoundments to these amphibians and reptiles should be factored into any management decisions.

The rarest confirmed species of amphibians and reptiles in the park are the four-toed salamander, wood turtle, and the northern watersnake. No special management effort is recommended for four-toed salamanders other than preserving vernal pools (such as near the Hurricane Campground at waypoint PR5) and managing forests for old growth conditions with abundant downed woody debris. Shrub wetlands with moss hummocks are also important for this species (such as on Sand Point at waypoint PR75). No special management effort is recommended for wood turtles which are considered accidental. Northern watersnakes appear to be very rare in the Sullivan Creek and Hurricane River systems. Additional surveys are needed to identify critical habitat areas, which may include hibernating sites (often beaver dams) and foraging areas (warm, still water areas with frogs and fishes).

Additional rarer species that are probably present are common mudpuppies, mink frogs, northern leopard frogs, and the northern ring-necked snake. If common mudpuppies are confirmed preservation of lake (or stream) bottom structure is important, where this salamander utilizes retreats among flat rocks, submerged logs, and other crevices for cover, foraging, and nesting. Mink frogs prefer permanent lakes and ponds with abundant aquatic macrophyte beds, and natural shorelines. Special attention to preserving these plant communities would benefit mink frogs where they are confirmed. Northern leopard frogs prefer open shallow wetlands, such as sedge meadows, marshes, and bogs, but also require permanent waters in which to hibernate. The Hurricane River sedge meadow south of the park boundary (waypoints PR31, PR34), portions of the Kingston Plains, the Beaver Lake beaver pond area (PR61) and other open wet meadows in the Beaver Basin, open wet meadows along some rivers (e.g., Mosquito River, PR74), and the Sand Point area, all appear to provide good existing habitat for this species. Preservation of these wetland complexes should benefit northern leopard frogs where they are confirmed. No special management effort is recommended for northern ring-necked snakes other than maintenance of adjacent forest and meadow communities as discussed above. Northern ring-necked snakes forage in forests but utilize adjacent meadows for thermoregulation.

5.2 Inventory and Monitoring

Inventory and monitoring recommendations build on Casper (2004), and with comments specific to Pictured Rocks National Lakeshore. See Casper (2004) for additional details on methodology.

5.2.1 Anuran Calling Surveys

Existing routes should be expanded to include more park interior sites. Suggested additional sites to add to new or existing routes are at waypoints (west to east) PR80, PR74, PR11, PR9, PR10, Kingston Lake area (numerous waypoints), PR7, PR6, PR5, PR2, and PR50. These are all road accessible. It may also be desirable to include stops at the headwater meadows of the Hurricane River, such as waypoints PR31 and PR34, even though this is outside current park boundaries. Finally, monitoring in the Beaver Basin would be desirable because of its wilderness features and excellent habitat quality, but surveys there would be logistically difficult. This area may warrant use of remote frog loggers. Appropriate listening stops could include waypoints PR96, PR23, PR127, PR97, and PR61.

Expanded anuran calling surveys would determine, over time, whether boreal (or western) chorus frogs, Cope's gray treefrogs, or American bullfrogs are present in the park. They may also confirm localities for mink frogs and northern leopard frogs, however these latter species would also benefit from visual searches.

5.2.2 Aquatic Funnel Traps

Sampling via aquatic funnel trapping is recommended for monitoring of blue-spotted salamanders, spotted salamanders, and eastern newts, and could include the following locations: Sand Point ponds (PR104), PR11, PR23, PR97, selected ephemeral wetlands and ponds near Beaver and Little Beaver Lakes, Kingston Lake ponds (TA6, TA9), PR68, PR5 (especially good pond), and other ponds and ephemeral wetlands as may be discovered.

5.2.3 Aquatic Turtle Traps

This is a highly effective method for monitoring painted and snapping turtles, and could include the following locations: Sand Point ponds (PR104), PR93, PR11, PR64, Little Beaver Lake (PR10), Beaver Lake beaver pond (PR61), Beaver Basin ponds (PR127), Kingston Lake and ponds thereof (PR8 and others), Twelve Mile Campground ponds (PR69), Section 16 Lake (PR68), and Grand Sable beaver pond (PR2).

5.2.4 Cover Object Surveys

Cover object surveys are recommended for monitoring snakes in the park (smooth greensnake, eastern gartersnake, northern red-bellied snake, northern ring-necked snakes). Appropriate locations could include: Sand Point barrens (PR41, PR41-43), meadows around PR107, Chapel Beach sandscape (PR92), Beaver Lake campground area (PR62), Lowney Creek impoundment area (PR96), Beaver Rim Road meadow (PR59), meadow at PR114, selected areas around Kingston Lake, Grand Sable beaver pond (PR119, PR48), Grand Sable Visitor Center (PR25), and the meadow at PR120. It may also be desirable to include stops at the headwater

meadows of the Hurricane River, around waypoint PR31.

5.2.5 Other Surveys

Four-toed salamanders may be monitored by nest searches at known breeding ponds (i.e., PR5).

Eastern red-backed salamanders may be monitored by time or area constrained visual searches of ground litter and downed woody debris in mature hardwood forests. Suggested areas are forests around Miners Lake, Chapel Lake, Little Beaver Lake, and Section 16 Lake (PR67). Other mature stands may also be chosen.

If common mudpuppy reports surface within the park, aquatic trapping may be attempted to determine monitoring feasibility.

Mink frog and northern leopard frog populations may be located by calling or visual surveys.

Visual surveys for northern watersnakes are recommended in the Sullivan Creek and Hurricane River areas.

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7. Figures

Figure 1: Study area.

Figure 2: Methods, minnow and turtle traps

Figure 3: Methods, cover objects

Figure 4: Blue-spotted Salamander

Figure 5: Spotted Salamander

Figure 6: Eastern Newt

Figure 7: Four-toed Salamander

Figure 8: Eastern Red-backed Salamander

Figure 9: Eastern American Toad

Figure 10: Northern Spring Peeper

Figure 11: Gray Treefrog

Figure 12: Northern Green Frog

Figure 13: Wood Frog

Figure 14: Eastern Snapping Turtle

Figure 15: Painted Turtle

Figure 16: Smooth Greensnake

Figure 17: Eastern Gartersnake

Figure 18: Northern Red-bellied Snake

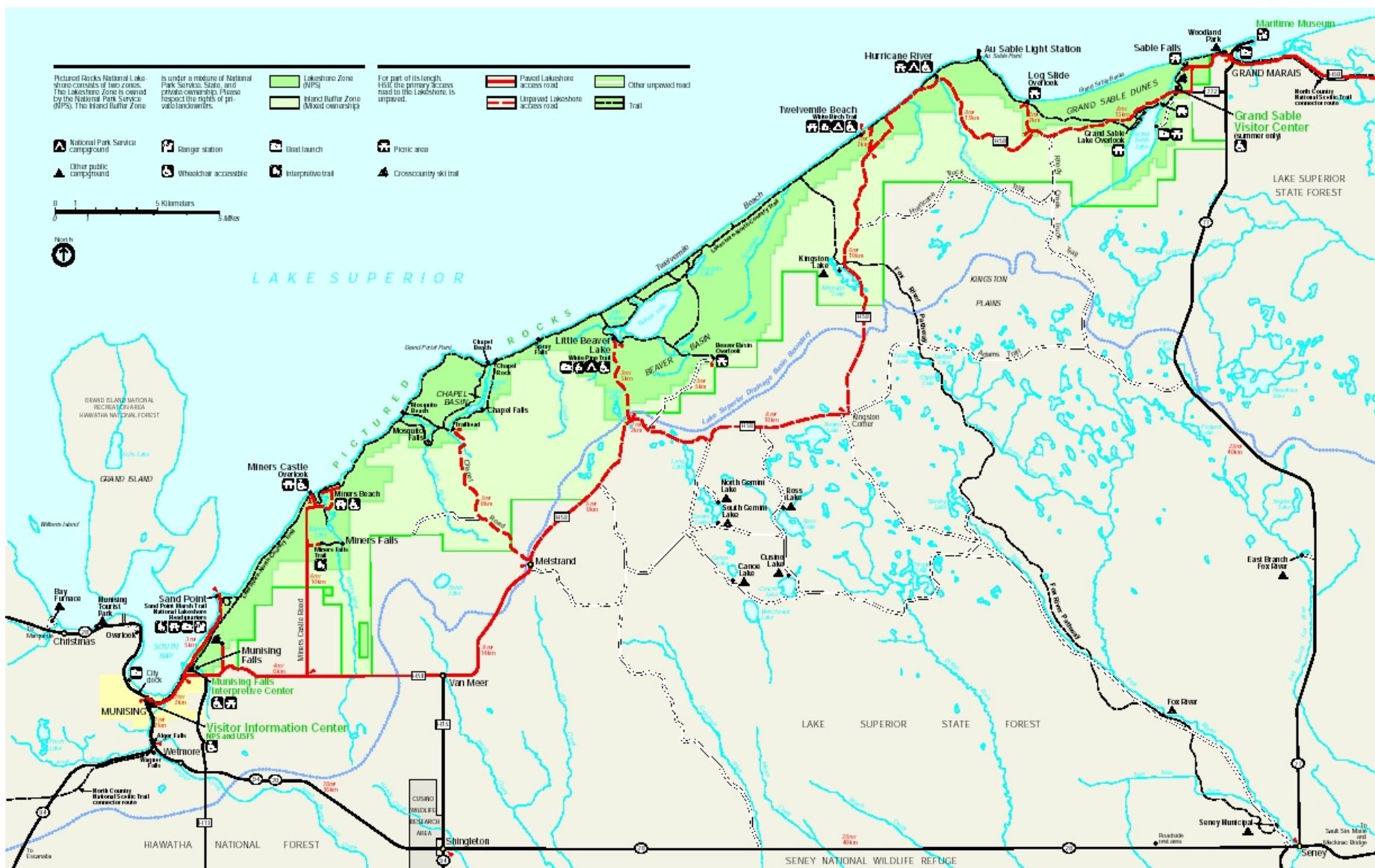


Figure 1: Study Area, Pictured Rocks National Lakeshore, Alger County, Michigan.

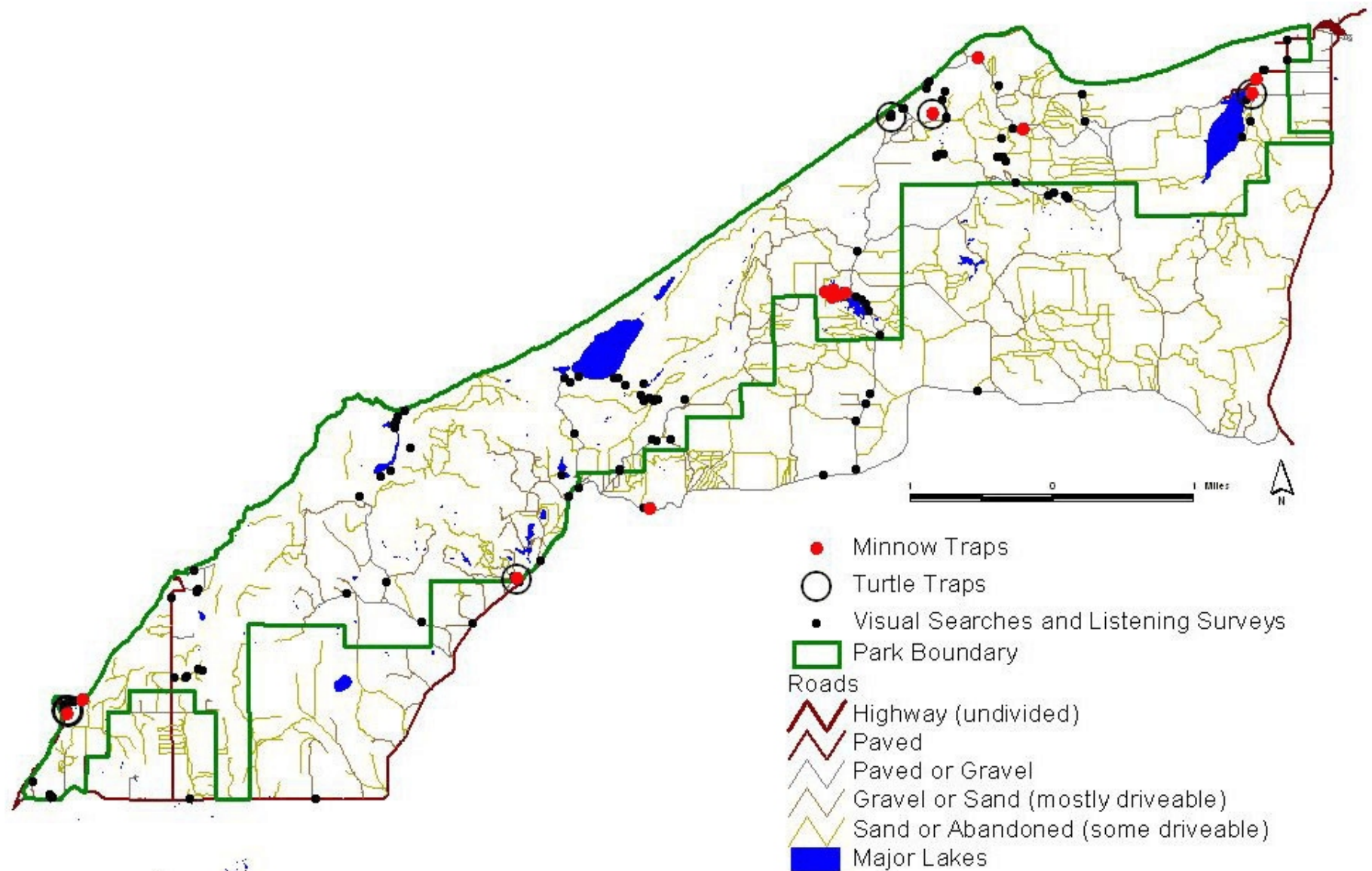


Figure 2: Map of Pictured Rocks National Lakeshore showing locations of minnow traps, turtle traps, and visual searches and listening surveys, 2004.

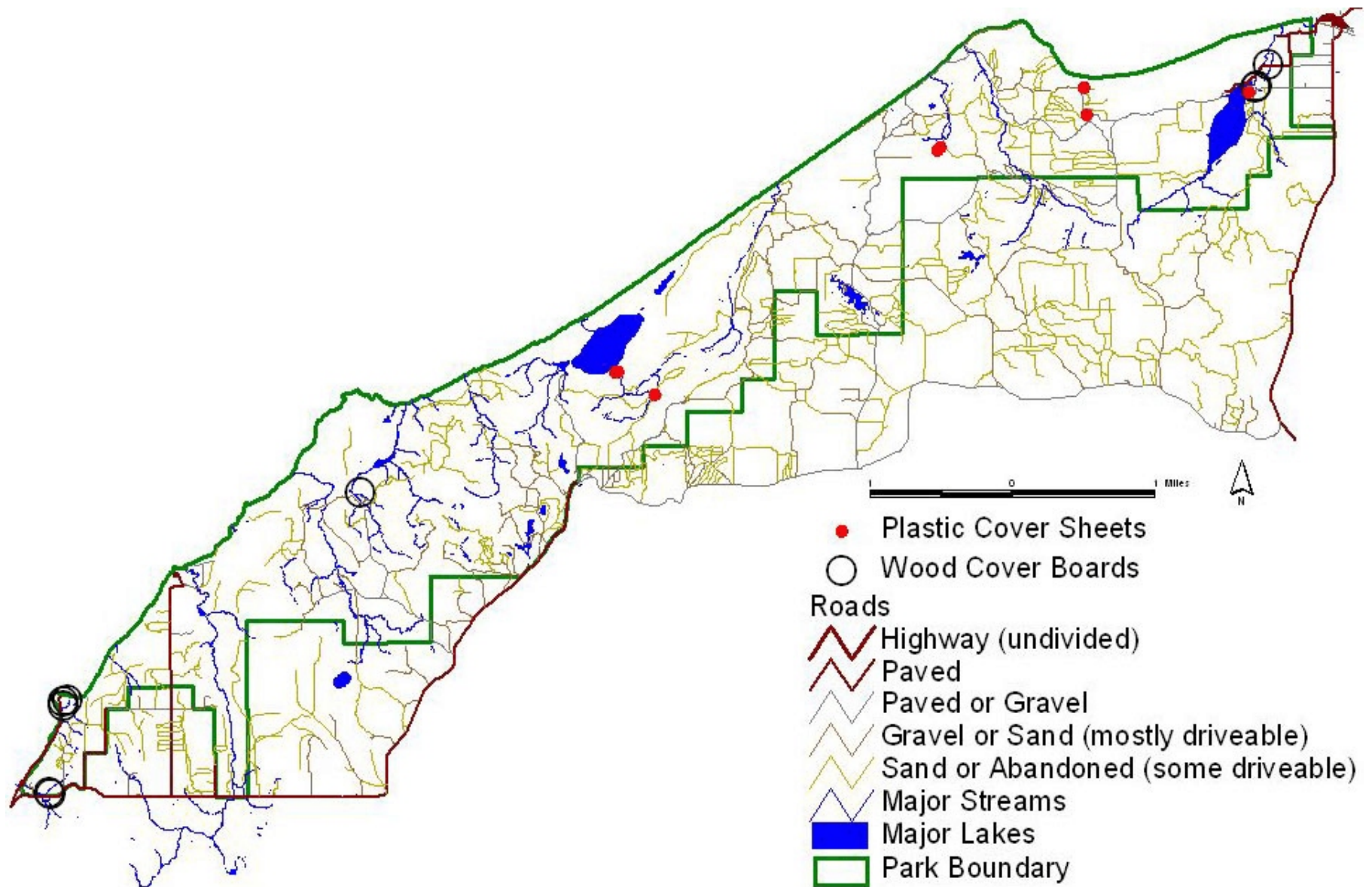


Figure 3: Map of Pictured Rocks National Lakeshore showing locations of cover objects, 2004.

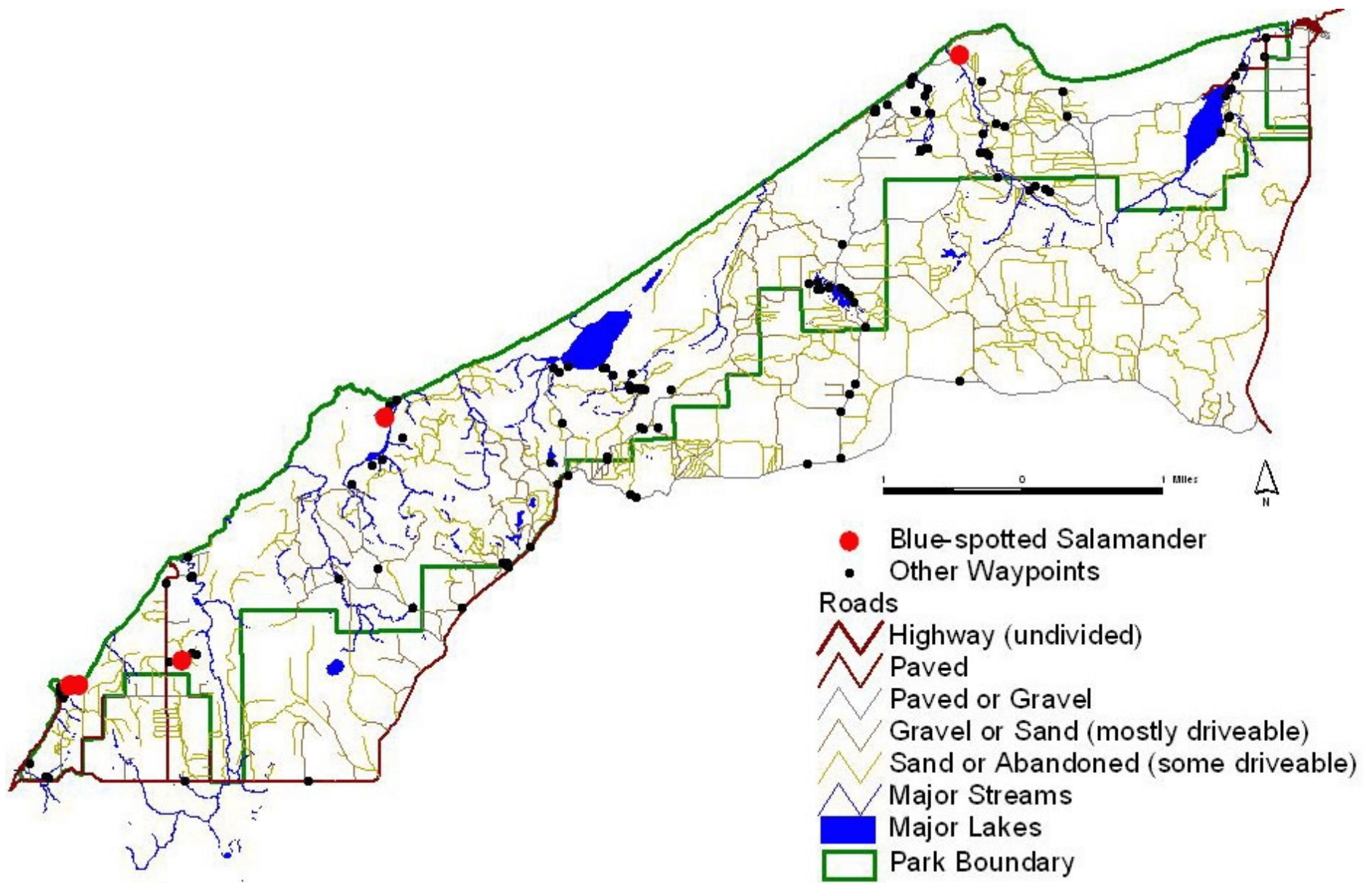


Figure 4: Locations of blue-spotted salamanders at Pictured Rocks National Lakeshore, 2004.

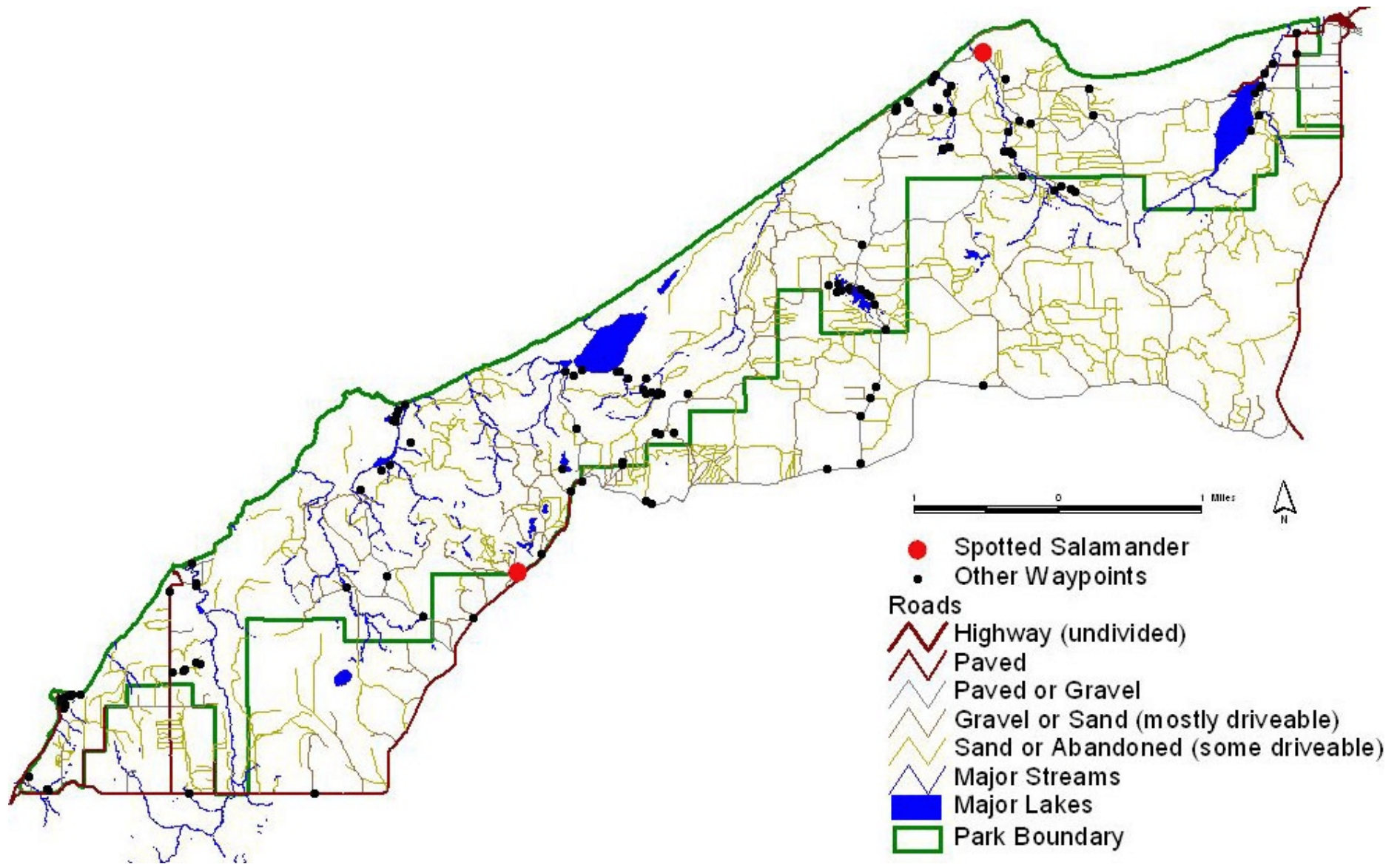


Figure 5: Locations of spotted salamanders at Pictured Rocks National Lakeshore, 2004.

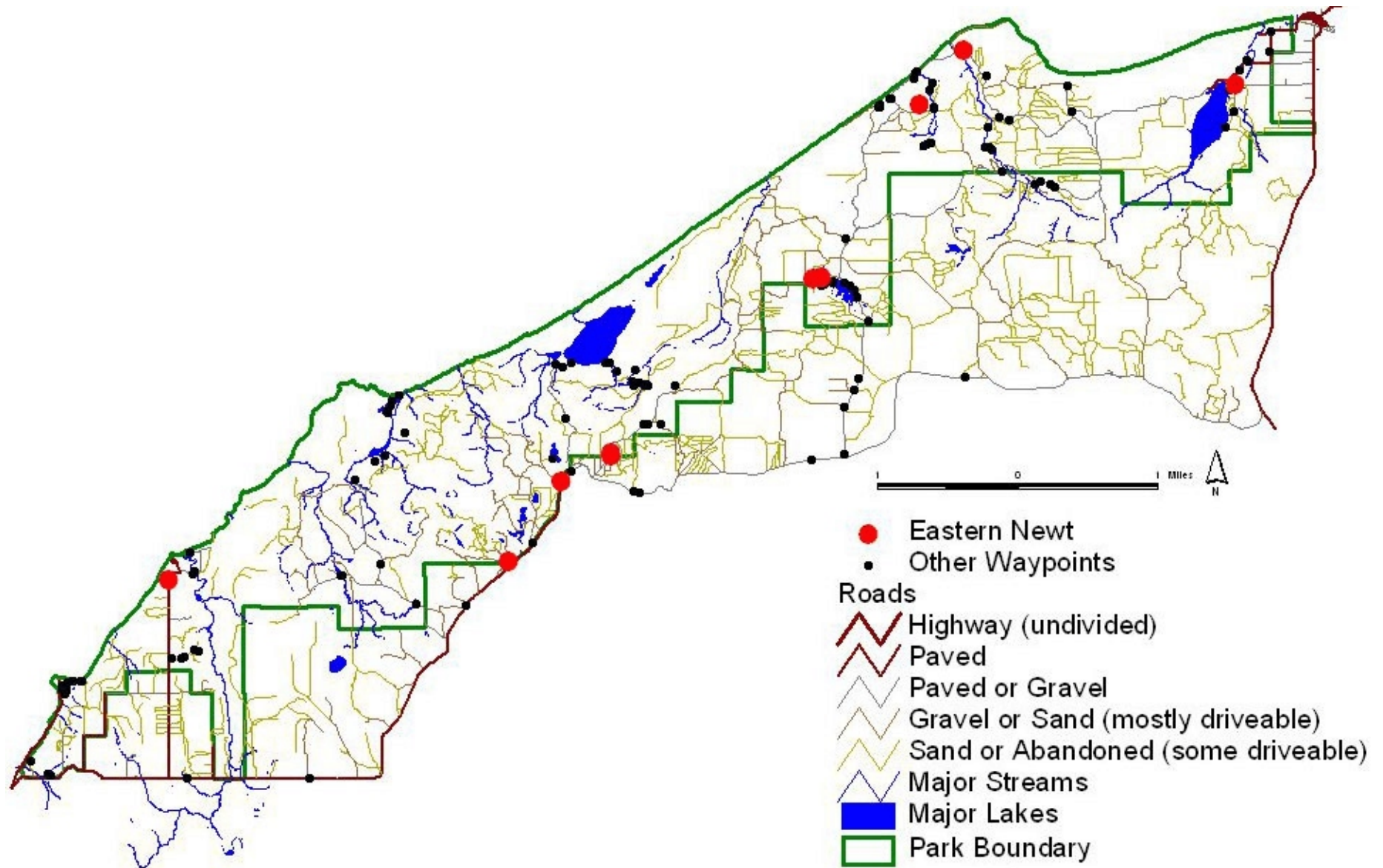


Figure 6: Locations of eastern newts at Pictured Rocks National Lakeshore, 2004.

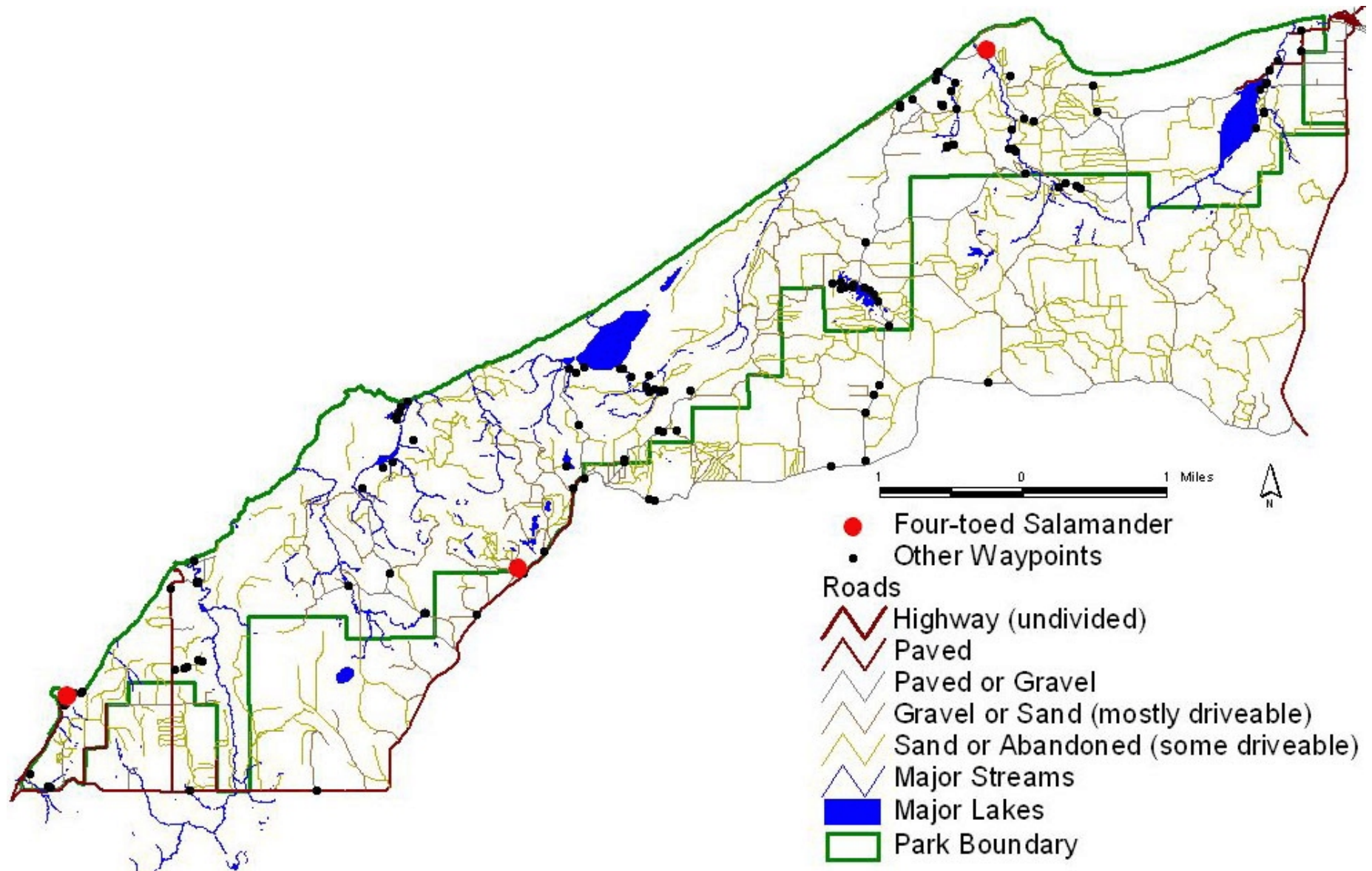


Figure 7: Locations of four-toed salamanders at Pictured Rocks National Lakeshore, 2004.

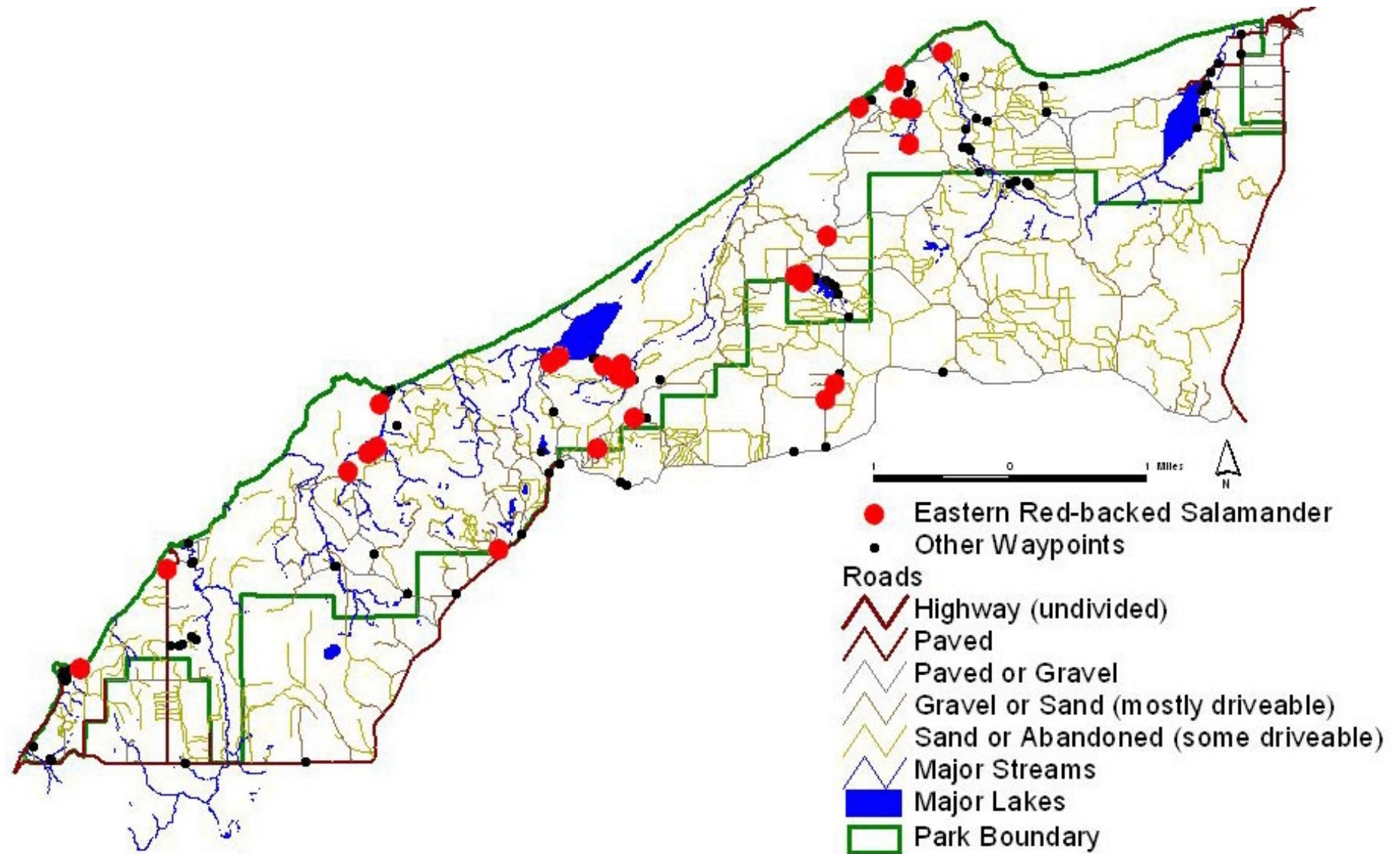


Figure 8: Locations of eastern red-backed salamanders at Pictured Rocks National Lakeshore, 2004.

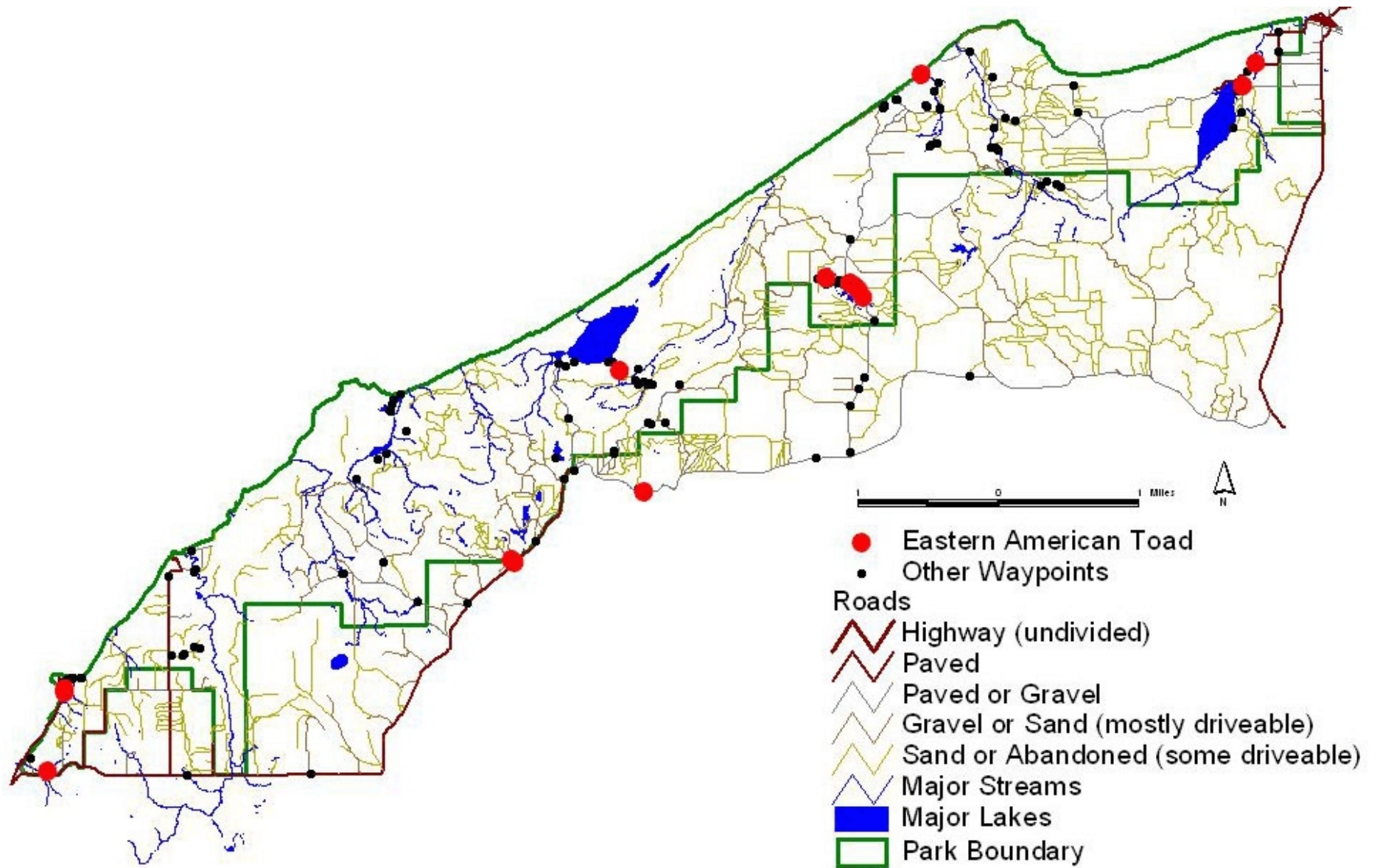


Figure 9: Locations of eastern American toads at Pictured Rocks National Lakeshore, 2004.

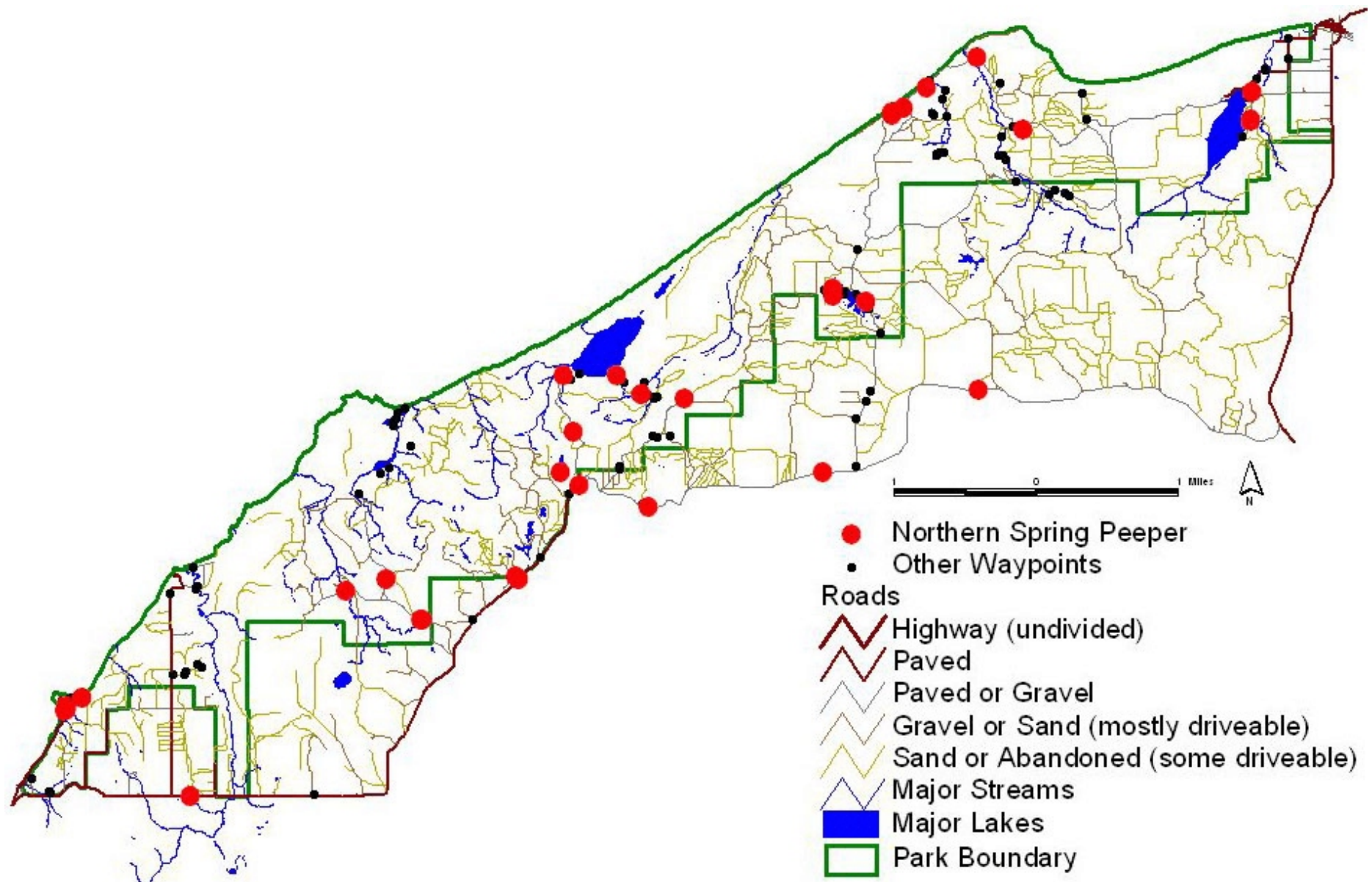


Figure 10: Locations of northern spring peepers at Pictured Rocks National Lakeshore, 2004.

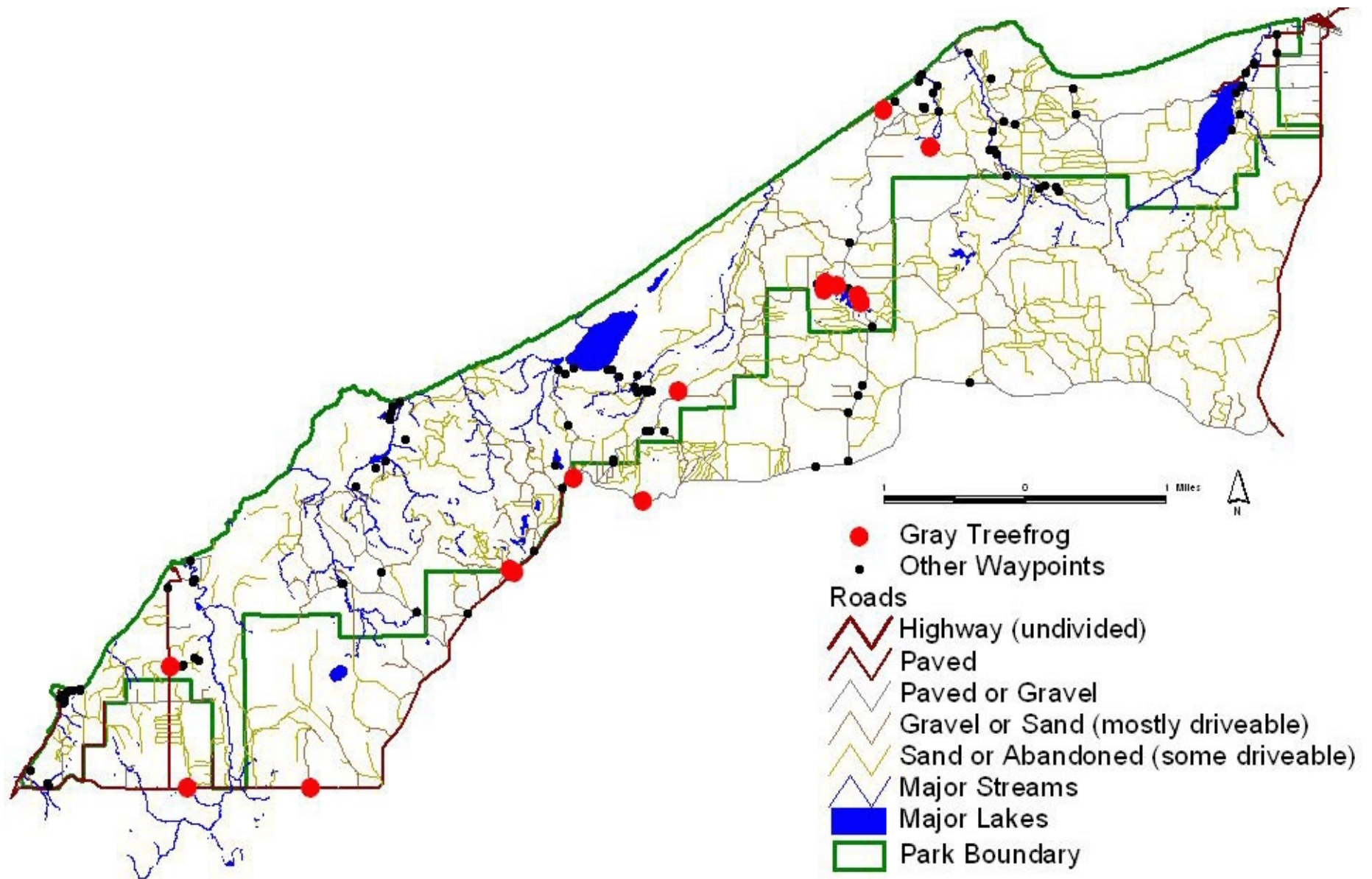


Figure 11: Locations of gray treefrogs at Pictured Rocks National Lakeshore, 2004.

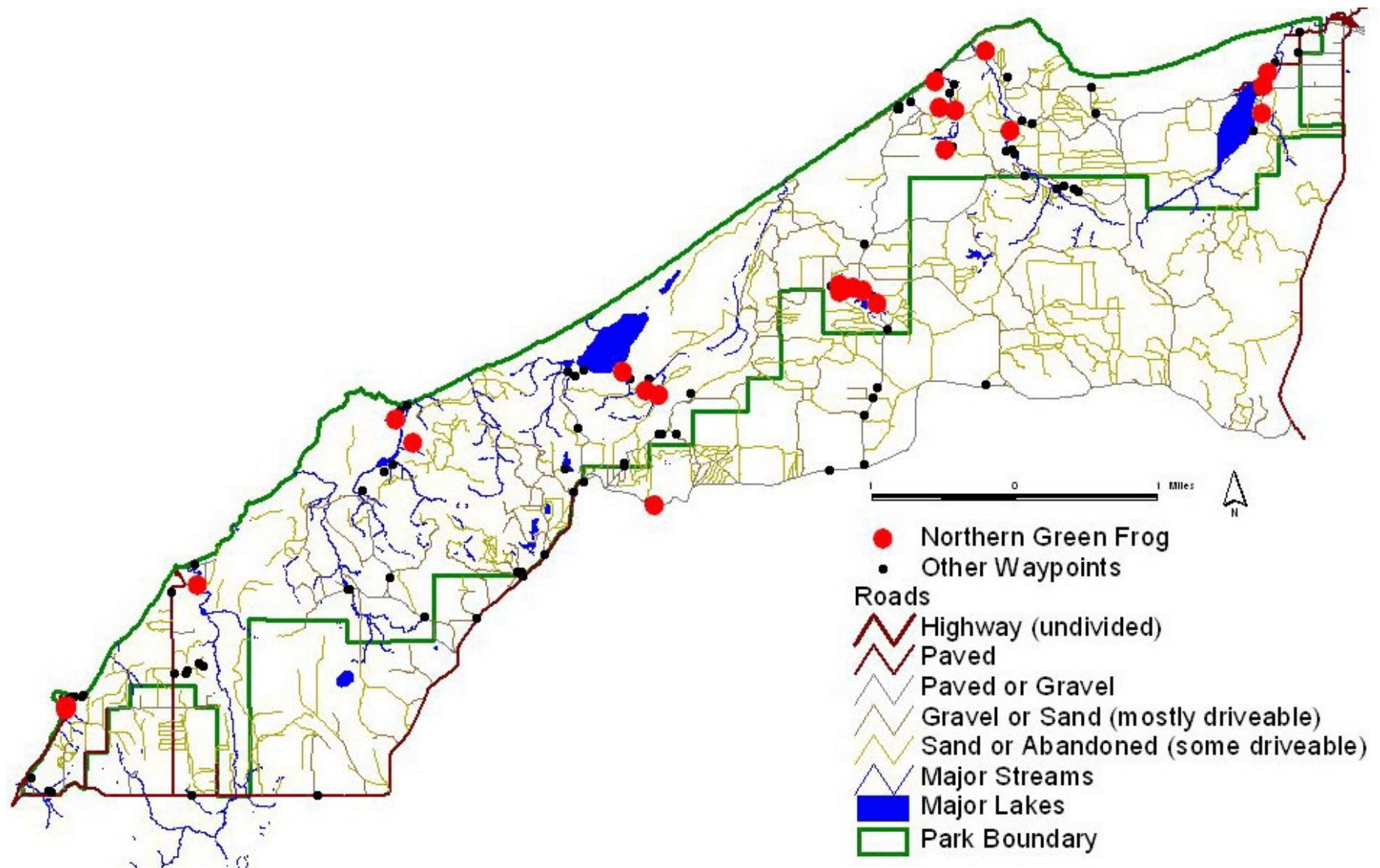


Figure 12: Locations of northern green frogs at Pictured Rocks National Lakeshore, 2004.

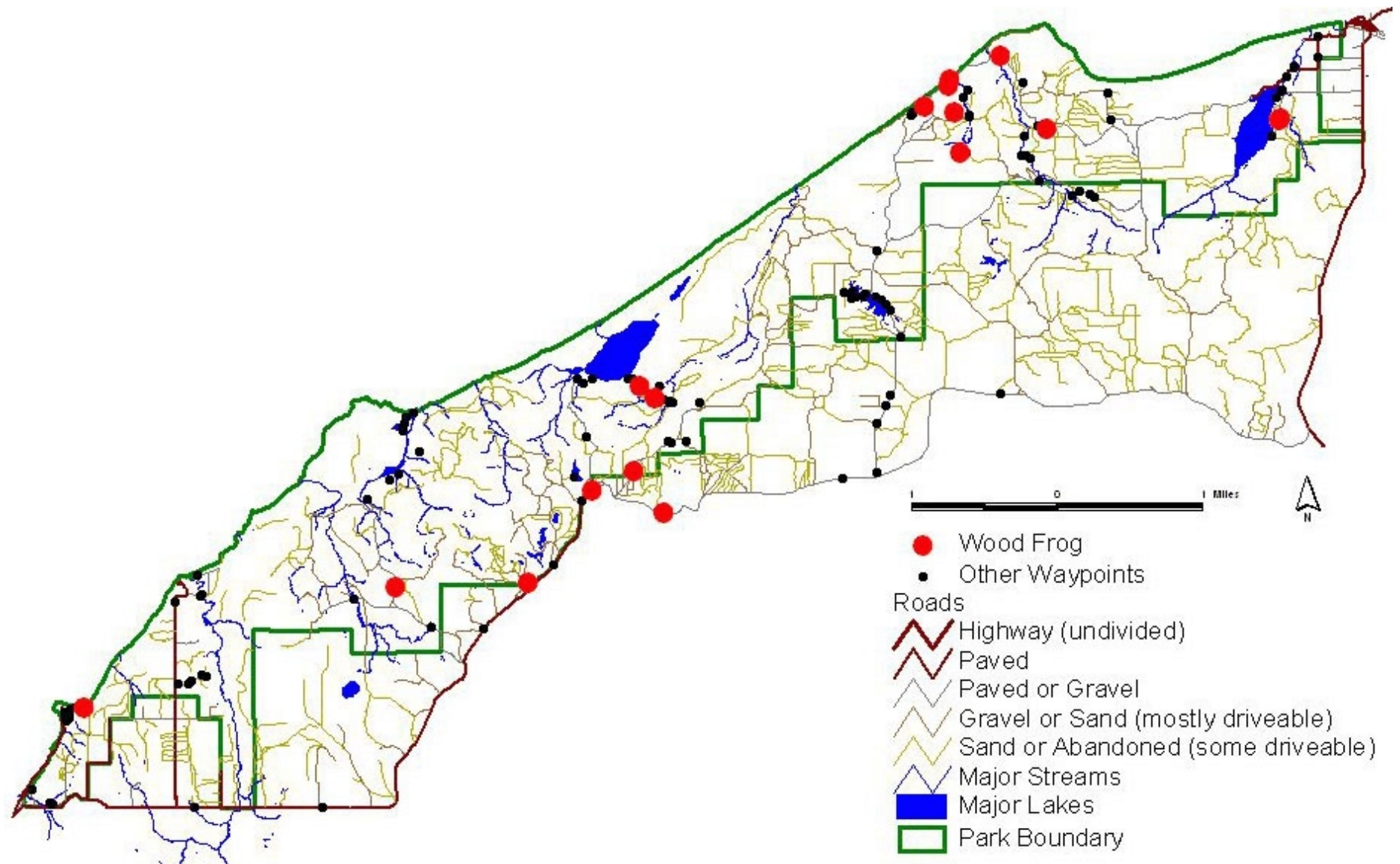


Figure 13: Locations of wood frogs at Pictured Rocks National Lakeshore, 2004.

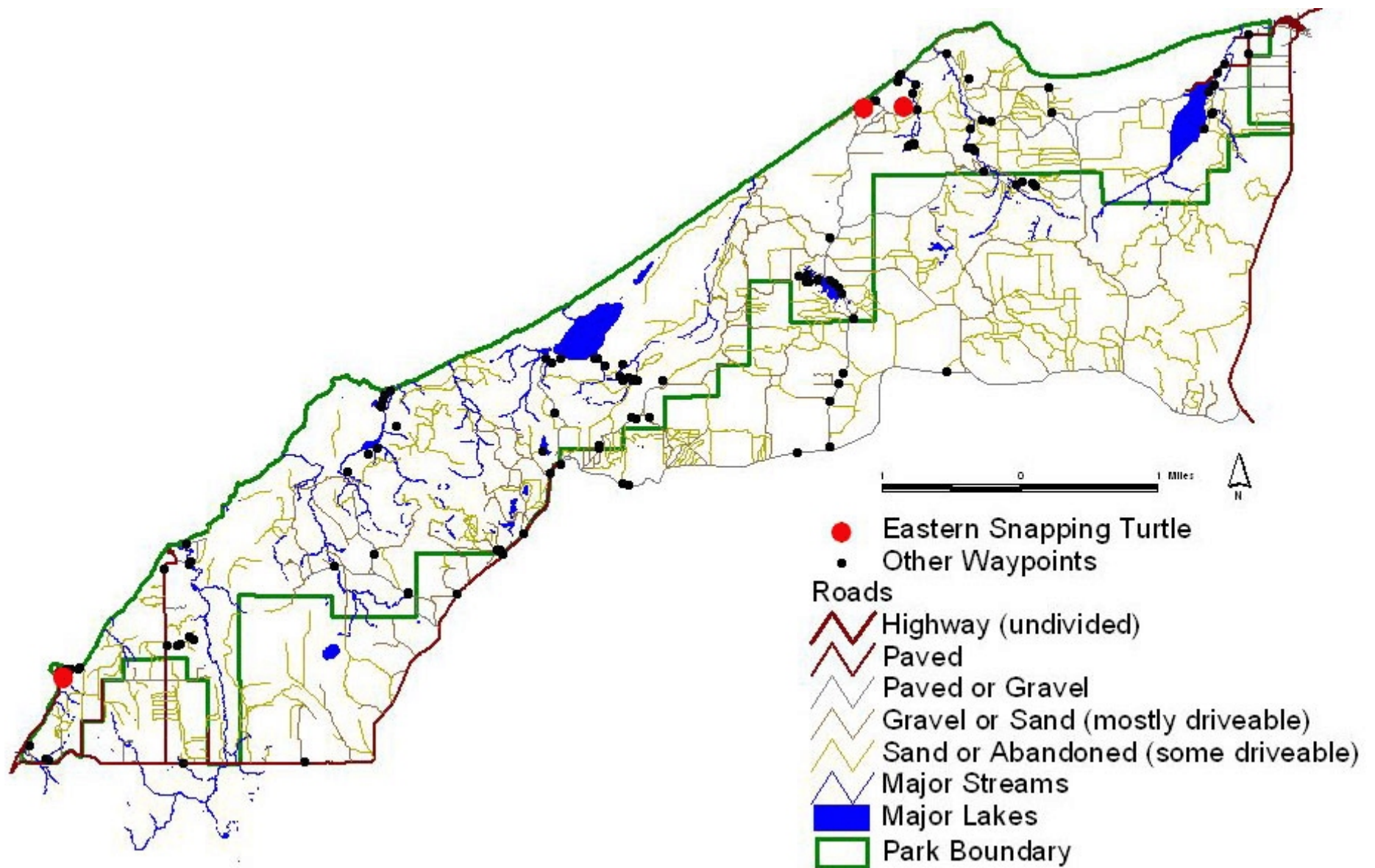


Figure 14: Locations of eastern snapping turtles at Pictured Rocks National Lakeshore, 2004.

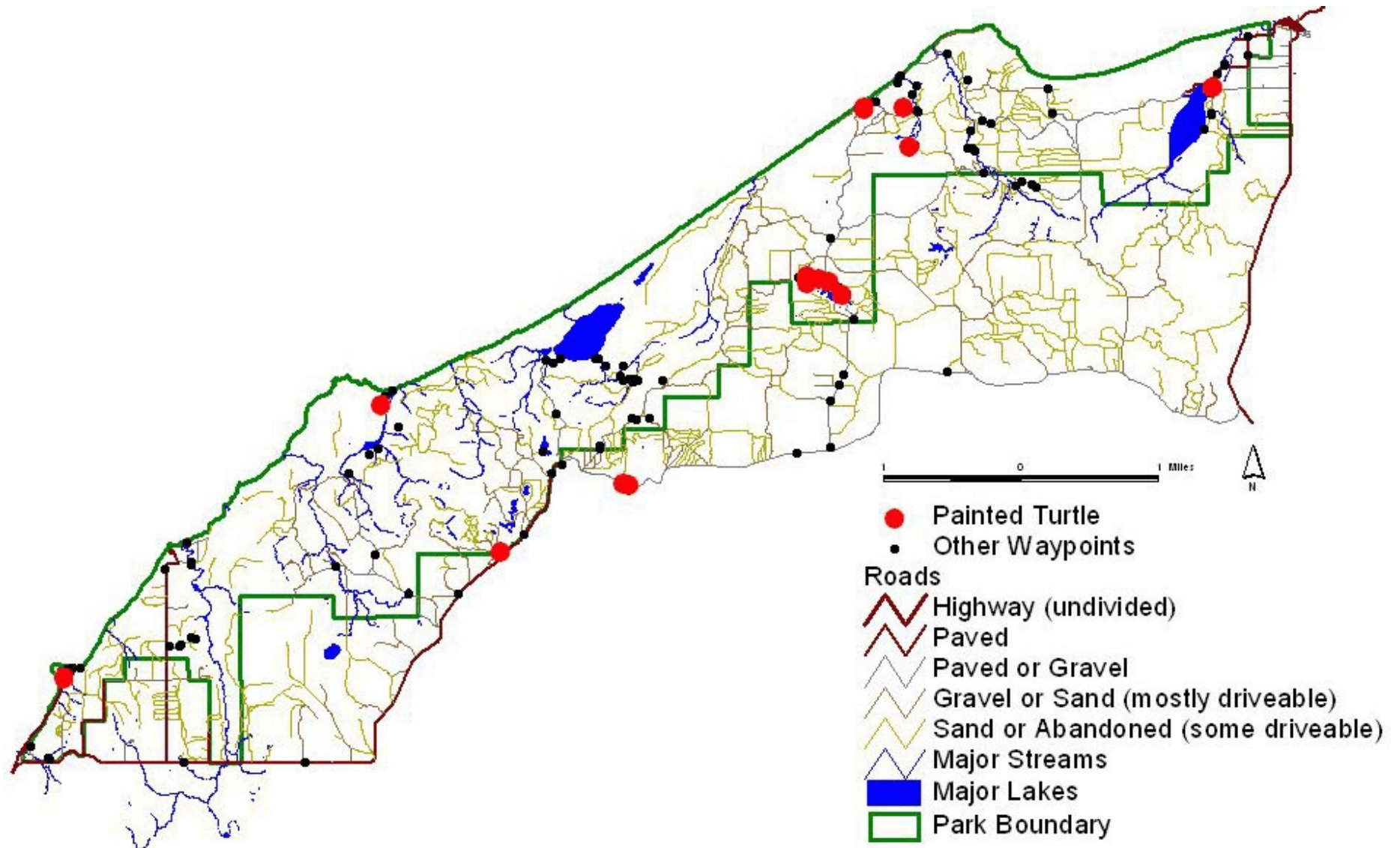


Figure 15: Locations of painted turtles at Pictured Rocks National Lakeshore, 2004.

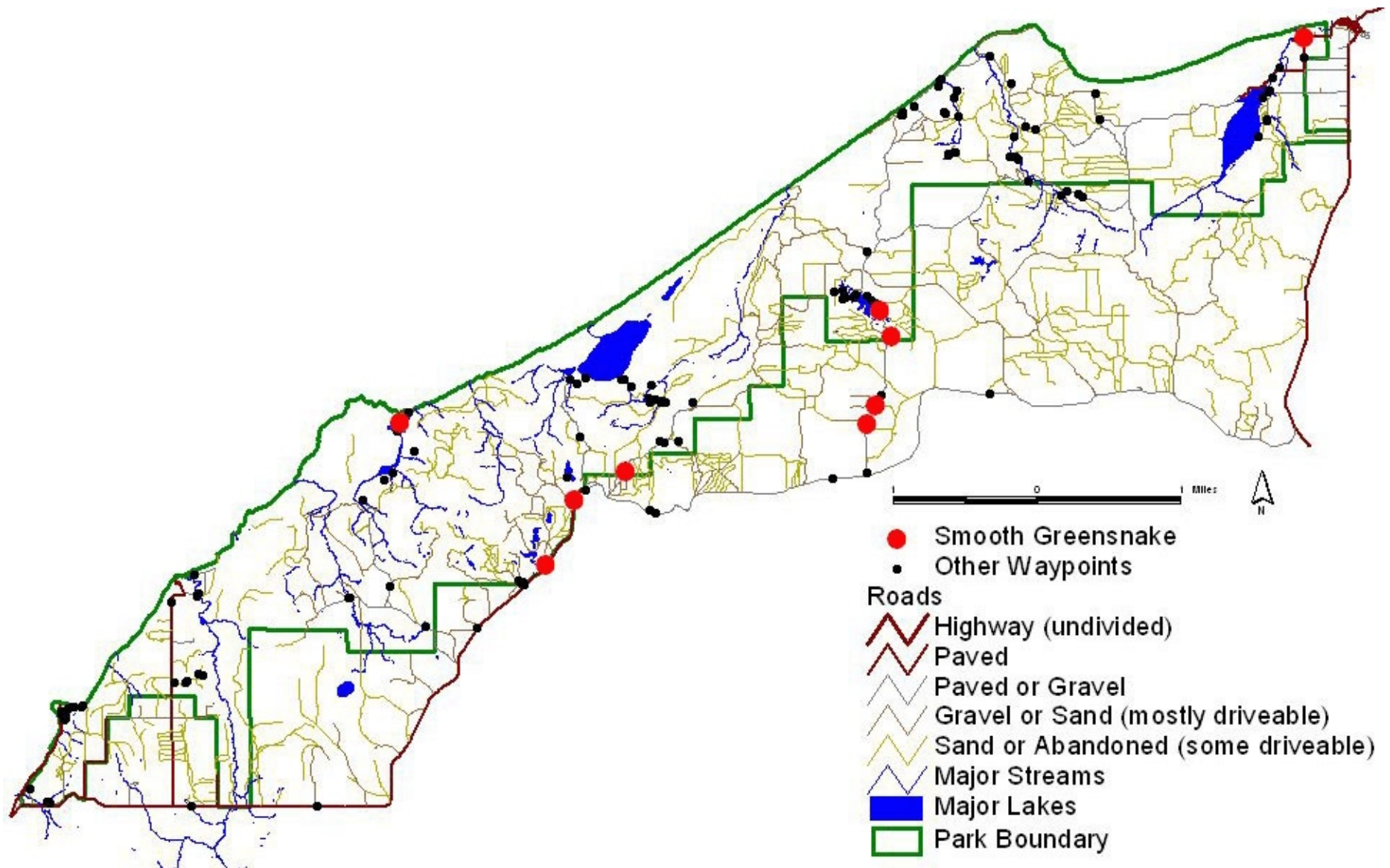


Figure 16: Locations of smooth greensnakes at Pictured Rocks National Lakeshore, 2004.

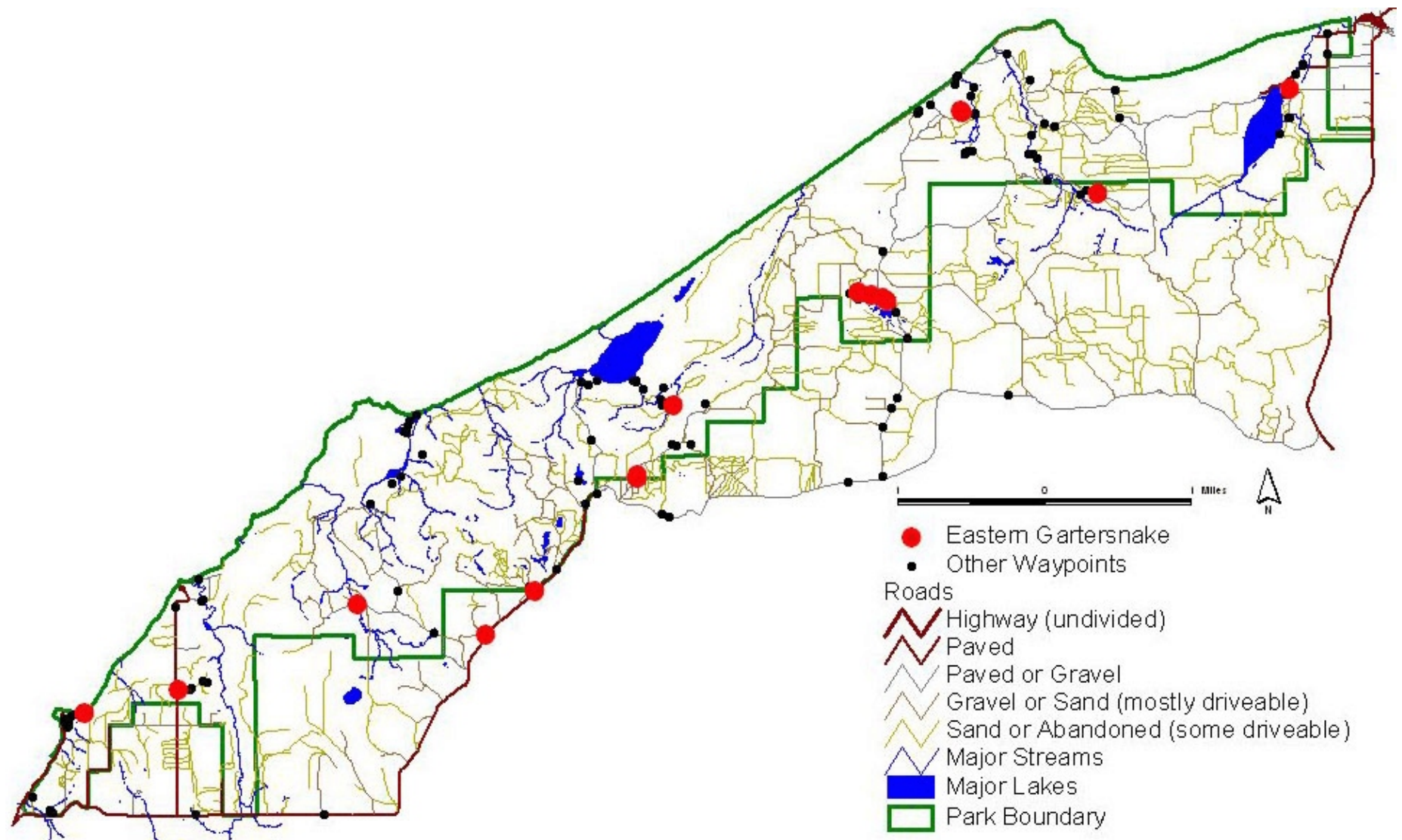


Figure 17: Locations of eastern gartersnakes at Pictured Rocks National Lakeshore, 2004.

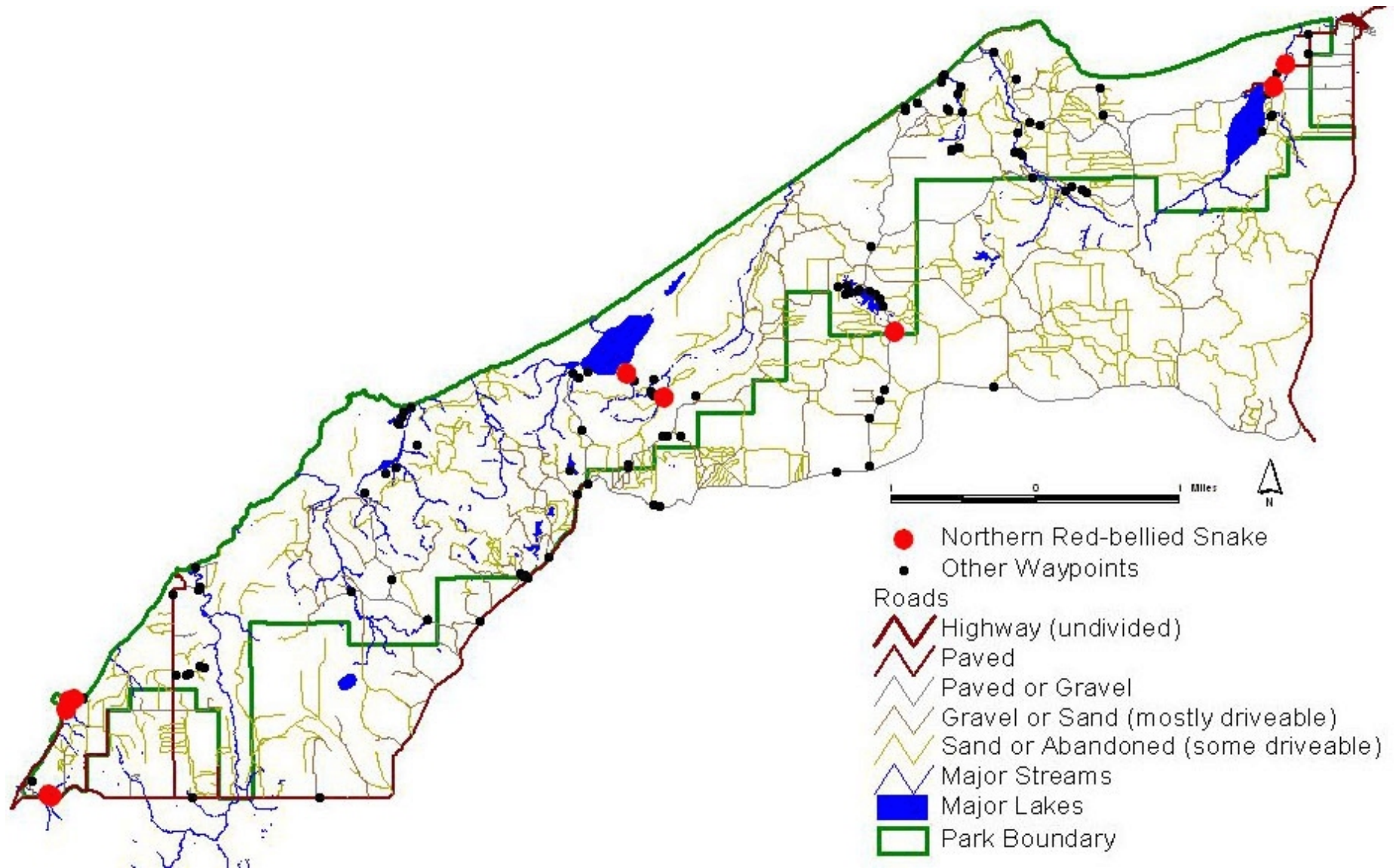


Figure 18: Locations of northern red-bellied snakes at Pictured Rocks National Lakeshore, 2004.

8. Tables

Table 1: Target species list

Table 2: Sampling Methods

Table 3: Museums canvassed for Alger County material

Table 4: Pictured Rocks National Lakeshore Herp Species List

Amphibian and Reptile Inventory of Pictured Rocks National Lakeshore, G.S. Casper, 2005

Table 1: Target species list

Common Name	Scientific Name	List Status ¹
SALAMANDERS		
Eastern Tiger Salamander	<i>Ambystoma tigrinum tigrinum</i>	Probably Present
Common Mudpuppy	<i>Necturus maculosus maculosus</i>	Probably Present
Four-toed Salamander	<i>Hemidactylium scutatum</i>	Present
FROGS		
Cope's Gray Treefrog	<i>Hyla chrysoscelis</i>	Probably Present
Pickerel Frog	<i>Rana palustris</i>	Probably Present
TURTLES		
Painted Turtle	<i>Chrysemys picta</i>	Present
Blanding's Turtle	<i>Emydoidea blandingii</i>	Probably Present
Wood Turtle	<i>Glyptemys (Clemmys) insculpta</i>	Present?
LIZARDS		
Common Five-lined Skink	<i>Eumeces fasciatus</i>	Unconfirmed
SNAKES		
Northern Ring-necked Snake	<i>Diadophis punctatus edwardsii</i>	Probably Present
Western Foxsnake	<i>Elaphe vulpina</i>	Probably Present
Eastern Milksnake	<i>Lampropeltis triangulum triangulum</i>	Unconfirmed
Northern Watersnake	<i>Nerodia sipedon sipedon</i>	Probably Present
DeKay's Brownsnake	<i>Storeria dekayi</i>	Unconfirmed

1 - 2003 National Park Service Great Lakes Network Office list status

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Table 2: Sampling methods employed for all sampling sites, Pictured Rocks National Lakeshore, 2004

Site	Method	N Set	Date Set	Dates Checked	N checks	Effort (N*N checked)
PR41, Sand Point nearest road and pond	boards	4	13-May-04	May 30, 31; June 1, 2, 3, 4, 5; Sept 11	8	32
PR42 to PR43, Sand Point	boards	6	13-May-04	May 30, 31; June 1, 2, 3, 4, 5; Sept 11	8	48
PR19, PR110, Ski Trail	boards	9	13-May-04	May 29; June 2; July 21; Sept 11, 13	5	45
PR46, Chapel parking lot	boards	7	13-May-04	May 30; June 3; July 21; Sept 11, 13	5	35
PR25, Grand Sable Visitor Center	boards	6	13-May-04	May 29, 31; June 1, 2, 3, 4, 5; July 22; Sept 10, 11	10	60
PR48, NE side Grand Sable inlet meadow	boards	3	13-May-04	May 29, 30; June 1, 2, 3, 4, 5; July 22; Sept 10, 11	10	30
PR2, Grand Sable inlet pond	boards	4	13-May-04	May 29, 30; June 1, 2, 3, 4, 5; July 22; Sept 10, 11	10	40
PR49, Grand Sable boat launch	Plastic	3	May 13-15	May 29; June 1; July 22; Sept 10	4	12
PR52, log slide cabin clearing	Plastic	4	May 13-15	May 29; June 1; July 22; Sept 11	4	16
PR53, jct Log Slide Road and Hwy 58.	Plastic	3	15-May-04	May 29; June 1; July 22; Sept 10, 12	5	15
PR54, PR56, W shore Sullivan Lake	Plastic	2	15-May-04	Sept 12	1	2
PR96, Lowney Creek impoundment	Plastic	5	15-May-04	June 4, Sept 13	2	10
PR61, PR62, Beaver Lake campgrounds	Plastic	2	15-May-04	June 4, Sept 13	2	4
PR1, Grand Sable east pond	minnow traps	4	8-May-04	May 9, 10, 11	3	12
PR3, Section 11 pond	minnow traps	2	8-May-04	May 9, 10, 11	3	6
PR5, Hurricane River pond	minnow traps	6	8-May-04	May 9, 10, 11	3	18
PR16, Sand Point West	minnow traps	6	10-May-04	May 9, 10, 11	3	18
PR2, Grand Sable inlet pond	minnow traps	6	11-May-04	May 12, 13	2	12
PR17, Sand Point East	minnow traps	6	11-May-04	May 12	1	6
PR72, Adams Trail wetland	minnow traps	4	1-Jun-04	June 2, 3, 4	3	12
PR68, Section 16 Lake	minnow traps	4	1-Jun-04	June 2, 3, 4, 5	4	16
PR68, Section 16 Lake	minnow traps	6	11-Sep-04	Sept 12, 13	2	12
PR86, Long Lake pond	minnow traps	5	3-Jun-04	June 4	1	5
PR8, Kingston Lake campground	minnow traps	3	3-Jun-04	June 4, 5	2	6
TA9, TA6, TA-POND, NW Kingston ponds	minnow traps	3	3-Jun-04	June 4, 5	2	6
PR68, Section 16 Lake	turtle traps	2	30-May-04	May 31; June 1, 2, 3, 4, 5	6	12
PR69, Twelve Mile Beach Campground ponds	turtle traps	2	30-May-04	May 31; June 1, 2, 3, 4, 5	6	12
PR72, Adams Trail wetland	turtle traps	3	30-May-04	May 31; June 1, 2, 3, 4, 5	6	18
PR73, PR104, PR105, Sand Point	turtle traps	3	30-May-04	May 31; June 1, 2, 3, 4, 5	6	18
PR2, Grand Sable inlet pond	turtle traps	2	30-May-04	May 31; June 1, 2, 3, 4, 5	6	12

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Table 3: Museums canvassed in 2004 for Alger County material

Museum	Acronym	N specimens
University of Kansas Museum of Natural History, Lawrence	KUNHM	0
Louisiana State University Museum of Natural Science, Baton Rouge	LSUMZ	0
U.S. National Museum, Smithsonian Institution	USNM	0
University of Michigan Museum of Zoology, Ann Arbor	UMMZ	124
California Academy of Sciences, San Francisco	CAS	3
Carnegie Museum, Pittsburgh, PA	CM	6
Michigan State University Museum, East Lansing	MSUM	30
Milwaukee Public Museum	MPM	0
University of California, Berkeley, Museum of Vertebrate Zoology	MVZ	0
University of Minnesota, James Ford Bell Museum of Natural History, Minneapolis	JFBM	0
American Museum of Natural History, New York	AMNH	0
Harvard Museum of Natural History, Cambridge, MA	MCZ	0
University of Texas at Arlington	UTA	0
Museum of Southwestern Biology, University of New Mexico, Albuquerque	MSB	0
San Diego Natural History Museum	SDNH	0
Natural History Museum of Los Angeles County	LACM	0
Delaware Museum of Natural History	DMNH	0
Bernice Bishop Museum, Honolulu, Hawaii	BPBM	0
Royal Ontario Museum, Toronto	ROM	0

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Table 4: Pictured Rocks National Lakeshore herp species list from 2004 inventory

Common Name	Scientific Name	Park Status	Comments
Salamanders			
Blue-spotted Salamander	<i>Ambystoma laterale</i>	Confirmed Present	common, widespread
Spotted Salamander	<i>Ambystoma maculatum</i>	Confirmed Present	common, widespread
Eastern Newt	<i>Notophthalmus viridescens</i>	Confirmed Present	common, widespread
Four-toed Salamander	<i>Hemidactylium scutatum</i>	Confirmed Present	local, widespread
Eastern Red-backed Salamander	<i>Plethodon cinereus</i>	Confirmed Present	common, widespread
Common Mudpuppy	<i>Necturus maculosus maculosus</i>	Probably Present	no records for park
Frogs and Toads			
Eastern American Toad	<i>Bufo americanus americanus</i>	Confirmed Present	common, widespread
Western Chorus Frog or Boreal Chorus Frog	<i>Pseudacris triseriata</i> or <i>P. maculata</i>	Probably Absent	unconfirmed records
Northern Spring Peeper	<i>Pseudacris crucifer crucifer</i>	Confirmed Present	common, widespread
Gray Treefrog	<i>Hyla versicolor</i>	Confirmed Present	common, widespread
Cope's Gray Treefrog	<i>Hyla chrysoscelis</i>	Probably Absent	no records for park
American Bullfrog	<i>Rana catesbeiana</i>	Probably Absent	unconfirmed records nearby
Northern Green Frog	<i>Rana clamitans melanota</i>	Confirmed Present	common, widespread
Pickerel Frog	<i>Rana palustris</i>	Probably Absent	no records for park
Northern Leopard Frog	<i>Rana pipiens</i>	Probably Present	unconfirmed records
Mink Frog	<i>Rana septentrionalis</i>	Probably Present	unconfirmed records
Wood Frog	<i>Rana sylvatica</i>	Confirmed Present	common, widespread
Turtles			
Eastern Snapping Turtle	<i>Chelydra serpentina serpentina</i>	Confirmed Present	common, widespread
Painted Turtle	<i>Chrysemys picta</i>	Confirmed Present	common, widespread
Wood Turtle	<i>Glyptemys (Clemmys) insculpta</i>	Accidental	occasional, no breeding population
Blanding's Turtle	<i>Emydoidea blandingii</i>	Probably Absent	no records for park
Snakes			
Northern Ring-necked Snake	<i>Diadophis punctatus edwardsii</i>	Probably Present	unconfirmed records nearby
Western Foxsnake	<i>Elaphe vulpina</i>	Probably Absent	no records for park
Northern Watersnake	<i>Nerodia sipedon sipedon</i>	Confirmed Present	rare and local
Smooth Greensnake	<i>Opheodrys vernalis</i>	Confirmed Present	common, widespread
Northern Red-bellied Snake	<i>Storeria occipitomaculata occipitomaculata</i>	Confirmed Present	common, widespread
Eastern Gartersnake	<i>Thamnophis sirtalis sirtalis</i>	Confirmed Present	common, widespread

9. Appendices

Appendix A: Field notes

Appendix B: GPS waypoints

Appendix C: Voucher specimens

Appendix D: Historical museum data

Appendices are available to qualified researchers on request from the National Park Service's Great Lakes Network Office, Ashland, WI.